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THE NEWER KNOWLEDGE OF CANCER METABOLISM AND SOME OTHER ASPECTS OF CANCER RESEARCH—A REVIEW OF THE LITERATURE*

BY EUGENE C. GLOVER, M.D.†

DESPITE the remarkably rapid advance of medical knowledge during the past fifty years, many important problems remain unsolved today, and of these one of the most outstanding is the problem of malignant disease. Ignorance exists concerning both the fundamental cause of cancer and any logical and effective method of treatment other than by local destruction or removal of the offending tissue;—a procedure which only too often proves futile. Indeed, the descriptive study of cancer, the work of the pathologist, is the only aspect of the subject which in a sense has reached its maturity.

Maud Slye's[1] work upon the heredity of cancer in mice deserves mention as one of the few definite and important contributions of cancer research in recent years; and even this work becomes somewhat difficult to interpret when we try to apply the findings of heredity in mice to the problem of heredity in man.

Perhaps the most striking advance of the past few years in our understanding of malignant disease has been the discovery of the peculiar metabolism of tumors, which is so different from that of normal tissues. The main object of this paper is to review this newer knowledge of tumor metabolism. First, however, a few words will be devoted to a distinctly different subject, namely, the question of what may be the fundamental cause of cancer. Two of the most interesting theories of the origin of cancer are here presented. Though neither is well known or generally accepted, they offer many opportunities for further investigation, and it is to be hoped that studies during the next few years will reveal more clearly what merit they may have.

VITAMINS AND CANCER

The first of the theories is that arising from the work of Burrows[2]. It is based upon the fact that in tissue cultures he has observed that the conditions favorable for the independent growth of cells are crowding and stagnation. Hence he concludes that "cancer may be only the result of anything that leads to a local crowding of cells in the organism and a relative reduction in the blood supply to the mass" resulting in stagnation. Thus coal tar, x-rays, and other cancer-producing agencies attract cells to the point of application in a dense, stagnant mass with insufficient blood vessels. Carrying this idea further, he says that "growth depends on the presence of a certain high concentration of a substance or substances" which he calls "archusia (S)". This is formed by cells in proportion to the oxygen absorbed, and is readily soluble in the plasma and tissue fluids. "It can accumulate about the cells in quantities sufficient for growth only when a sufficient number of cells are liberating it in a small stagnant area from which it can not escape."[2] In low concentrations, which he terms "S^1", this substance has no effect at all. Medium concentrations, which he terms "S^2", stimulate cells to "migrate, differentiate, and function". High concentrations, "S^3", cause cells to grow and divide, while in still higher concentration, "S^4", the cells suffer self-digestion "similar to the degeneration seen in the center of cancerous nodules". Cancer tissue is said always to contain an "S^3" or "S^4" concentration of this archusia, whereas normal tissue never does.

Burrows also speaks of another substance, which he calls "ergusia", and which "acts to inhibit growth when added in excess to a growing system", being thus apparently antagonistic to "archusia" which promotes growth.

Surprisingly enough, "in studying more carefully the properties of the archusia and the ergusia, it was found that they are similar to the properties of vitamins B and A respectively". It has also been found that "archusia" fed to animals can replace the necessary vitamin B in their diet, while "ergusia removed from the body can be replaced again by feeding vitamin A"[2]. Vitamin A is said to be produced by the protoplasm of any growing cell in nature. It is not, however, liberated by cells during their growth but only when they are caused to suffer digestion and destruction in the presence of an excess of "archusia". "Vitamin B is only the archusia liberated by any growing cells in nature. Actively growing and non-toxic yeast and bacteria liberate only vitamin B. When these cells are allowed to overgrow their cultures and are destroyed by an S^4 concentration of their own archusia, vitamin A is liberated."

*From the Medical Service of the Collis P. Huntington Memorial Hospital of Harvard University.

†For record and address of author see "This Week's Issue," page 389.

Cancer tissues are stated by Burrows to contain much vitamin B but no vitamin A. Repeated applications of coal tar, he believes, produce cancer not only because the tar draws cells together in dense masses, but also because it "dissolves and removes the vitamin A from these tissues". The crowding allows the cells "to form and retain ample archusia or vitamin B for their growth". Cancer is therefore, according to Burrows, only the result of whatever sufficiently disturbs the vitamin balance of the tissues so that B predominates over A to an abnormal degree. Experiments with x-ray therapy[3] have borne out these contentions to a certain extent, but the interpretation of these experiments is somewhat complicated.

In summary, then, "normal life depends on a proper balance between vitamins A and B. The problem of the cure of cancer is the restoration of this balance. The problem of the prevention of cancer is the prevention of such imbalances taking place."[2]

This theory has little in common with the ordinary conceptions about vitamins; yet the work of Burrows is receiving serious consideration from authorities in the field of cancer research. Thus Ewing in the latest edition of "Neoplastic Diseases"[4] says, "Many but not all histological features of beginning cancer are consistent with this theory". Some support is lent, moreover, by other recent work on vitamins. Heaton[5], finds that vitamin B, (the growth activating substance of Burrows), is necessary for the growth of epithelium in tissue cultures. On the other hand Wolbach[6] and others have repeatedly shown that in animals fed on a diet free from vitamin A, (that is, free from the growth inhibitory factor of Burrows), the epithelium of the larynx, trachea, and other locations undergoes metaplasia with marked proliferation which might be considered precancerous in nature. Indeed, the formation of actual cancer as the result of such a diet has been reported by some investigators.[7]

FREUND AND KAMINER'S THEORY

Quite different in nature are the findings reported by Freund and Kaminer[8] that lead to the second theory of cancer to be considered here. Their work started originally with a more or less specific serodiagnostic test for cancer, based upon the fact that under certain conditions the serum of normal persons exerts a lytic effect upon cancer cells, whereas the serum of persons afflicted with cancer exerts no such lytic effect. The test is performed as follows. A suspension of cancer cells in saline solution is prepared by grinding the cancer tissue with some of the solution in a mortar and filtering out the coarser particles. Twenty drops of the serum to be tested are placed in a small test tube, with one drop of cancer cell emulsion and two drops of 1 per cent. sodium fluoride, or 0.3 per cent. tricresol, as a preservative. A cell count of a sample of this mixture is made by means of an ordinary hematocytometer counting chamber, and the remainder is incubated for 24 hours at 37° C., after which the cell count is repeated. The serum of patients who have cancer produces typically no change in the cell count, whereas the serum of normal persons causes a marked lysis and disappearance of cancer cells.

The authors claim that they have actually isolated the substance in normal serum which destroys cancer cells and that it is a dibasic saturated fatty acid with a molecular weight of about 500. Furthermore, the serum of cancerous persons is said to contain a different substance which protects cancer cells from the lytic action of normal serum, this substance being an *un*saturated fatty acid which is combined with the nucleoglobulin of the serum. Normal tissues, like normal serum, are found to contain the specific fatty acid which destroys cancer cells, but in precancerous conditions, such as ulcer of the stomach, or skin which has been repeatedly tarred, the destructive substance has disappeared. In early cases of cancer, the unaffected organs are said to show normal destructive power against cancer cell emulsions, but in late cases they lose this, and thus metatases to these organs are possible. The authors record that with increasing age of individuals the cancer destroying power of the serum gradually diminishes.

The serum of infants is about twenty times as powerful as that of adults, while in old age the serum is considerably less potent than in young adult life. Thus at the age when people are most liable to cancer, the carcinolytic power of the serum is found to be smallest.

Nor is this all, for Freund and Kaminer have isolated from the intestinal contents of normal persons the specific fatty acid which is supposed by them to destroy cancer cells and have shown that the intestinal secretions can actually form this substance in the test tube by acting on fats, especially palmitin. On the other hand, the intestinal contents of cancerous persons are said to contain the same unsaturated fatty acid which occurs in their serum and which protects cancer cells from destruction by normal serum. This also can be produced in the test tube by the intestinal secretions of cancerous persons when allowed to act upon palmitin and other fats. There is, therefore, in the intestine of the cancerous person, they say, an anomaly which hinders the production of the normal cancer destructive substance and in its place produces a pathological substance which protects cancer cells. This cancer protective substance is also said to form a complex compound with the carbohydrate of the blood stream, which makes it useless for the nutrition of normal tissues, but easily available for cancer tissue.

The authors believe that cancer occurs only in persons who are in some way predisposed to it. In such persons, local irritation, for example,

produces a local deficiency of the normal cancer destructive substance, and at the same time the cells begin to take up the pathological carbohydrate compound as nourishment. This stimulates the intestine to a greater and greater amount of pathologic fat digestion as described above, which results in an increased amount of cancer protective substance and a more active formation of the pathologic carbohydrate compound for its nourishment. Thus a vicious circle is set up and the cancer becomes well established. If, on the other hand, the person is cancer resistant, the intestine can not be stimulated to this pathologic fat digestion there is no increased formation of cancer protective substance, and hence a cancer is unable to develop at the point of local irritation.

Although this work was published in its final form three years ago[8], and the main principles outlined in 1912, little effort has been made to confirm or disprove it. Waterman[9], Peracchia[10] and a few others find the cytolytic reaction to be as specific for cancer as its originators claim that it is. As in the case of other so-called serodiagnostic tests for cancer, false positive reactions are given by certain non-cancerous conditions, notably when fever or pregnancy exists. Freund and Kaminer admit this fact, and it does not necessarily invalidate their conclusions any more than the exceptions to the specificity of the Wassermann reaction make it seriously unreliable. Kahn[11] states that the serum of persons over 45 years of age gives a positive Freund and Kaminer reaction, a serious charge if true. No one has attempted to repeat the more advanced work of Freund and Kaminer, such as the isolation of protective or lytic substances from the blood.

THE CARBOHYDRATE METABOLISM OF TUMORS

Within the past few years, some observations of fundamental importance have been made concerning the carbohydrate metabolism of malignant tumors. The work has been done chiefly by Otto Warburg and his collaborators[32] of the Kaiser Wilhelm Institute in Berlin. It constitutes unquestionably one of the most brilliant chapters in the history of cancer research.

By way of introduction it is to be recalled that there are two general methods by which organisms can obtain energy from the breakdown of carbohydrates, such as glucose or glycogen. One, which is the more familiar, is the oxidation of the carbohydrate to carbon dioxide and water, a process which liberates a relatively large amount of energy; the other is a splitting of the carbohydrate molecule into smaller molecules in the absence of oxygen, or without any consumption of oxygen if present. This process also yields energy to the cells, though much less in amount than the energy liberated by oxidation of the same amount of carbohydrate. It has long been recognized that certain bacteria and yeasts break down sugars anaerobically into such products as lactic acid and alcohol. More recently it has been found that similar processes take place in the higher animals. Meyerhof[13] and others have shown that the contracting muscle obtains its energy of contraction by the splitting of glycogen to lactic acid, a reaction which uses no oxygen. During the recovery process, about one-sixth of this lactic acid is apparently oxidized, thus furnishing enough energy so that the remaining five-sixths of the lactic acid are reconverted into glycogen[14]. Thus the muscle has a sufficient oxygen consumption so that no lactic acid accumulates in it, except temporarily. But if the muscle is made to contract in the absence of oxygen, a large amount of lactic acid collects. It may be said then that under anaerobic conditions the glycolysis of muscle is large; (by glycolysis is meant the splitting of glucose or glycogen to lactic acid); but under aerobic conditions the glycolysis is overbalanced by the respiration so that no lactic acid accumulates, except temporarily. Yeast on the other hand is fundamentally different. Its oxygen consumption, or respiration, is so small that it has little effect upon the lactic acid production, which remains practically the same whether oxygen is present or not.

What Warburg has done is simply to study the metabolism of normal resting tissues and of various tumor tissues in order to determine the relative importance of oxidation and of lactic acid fermentation in the carbohydrate metabolism of these tissues. He has also studied the metabolism under anaerobic conditions to see if perhaps some tissues which produce no lactic acid under normal conditions might not produce a considerable amount in the absence of oxygen. For, as already explained, if a tissue has a moderate ability to split glucose to lactic acid, and a moderate oxygen consumption as well, the energy produced by oxidation reactions will cause all the lactic acid which escapes oxidation to be reconverted into glucose, and so no lactic acid will be found unless the tissue is deprived of oxygen.

The method employed by Warburg[16] is to suspend a thin slice of tissue weighing but a few milligrams in a small vessel containing a few cubic centimeters of Ringer's solution containing the chlorides of sodium, potassium, and calcium, and also sodium bicarbonate, carbon dioxide, and glucose, in physiological amounts, and having a pH of 7.46. The tissue slices must be less than half a millimeter in thickness in order that oxygen may have free access to all the cells, if the Ringer's solution is in equilibrium with 95 per cent. oxygen; if it is in equilibrium with air, the slices must not exceed 0.2 millimeter in thickness. Such slices resemble tissue paper. Warburg cuts them free-hand with a very sharp knife. If the slices are kept within these limits of thickness, the rates of oxygen consumption and sugar destruction per milligram of tissue are independent of the thickness because all the

cells are in equilibrium with the surrounding medium.

To determine the anaerobic glycolysis, the vessel containing the slice of tissue in the Ringer's solution is filled with nitrogen containing 5 per cent. of carbon dioxide, connected with a Barcroft manometer, and the whole system immersed in a water bath at 38°C. and gently shaken for half an hour. Any increase in the volume of the gas at the end of this period is due to the liberation of carbon dioxide from the bicarbonate of the Ringer's solution by acid products of metabolism. Since repeated chemical analyses have shown that the only acid liberated is lactic acid, with a corresponding disappearance of glucose, the change in gas volume can by a simple calculation be translated into terms of lactic acid production, or glycolysis.

The above method determines the anaerobic glycolysis of the tissue slice. For aerobic conditions, Warburg fills the vessel with a mixture of 95 per cent. oxygen and 5 per cent. carbon dioxide. Here the problem becomes more complicated because the tissue uses up oxygen and at the same time liberates carbon dioxide, both as a direct result of oxidative processes and also indirectly by the action of lactic acid upon the bicarbonate of the Ringer's solution if lactic acid is produced. The manometer registers only the net effect of these various changes in partial pressure. It is, however, possible to determine how much of the volume change is due to oxygen consumption and how much to carbon dioxide production by running two experiments simultaneously in vessels containing different amounts of Ringer's solution, the one containing 3 and the other 8 cubic centimeters. This method is based upon the fact that while oxygen is scarcely soluble in the solution, carbon dioxide has a high solubility. Hence the consumption of one cubic centimeter of oxygen will have a much greater effect upon the gas volume than will the production of one cubic centimeter of carbon dioxide, since about half the evolved carbon dioxide will remain dissolved in the Ringer's solution. The running of two determinations simultaneously corresponds to the use of two simultaneous equations in solving for two unknown factors. The unknown factors in this case are oxygen consumption and carbon dioxide production.

One other matter of technique is of special interest. Instead of filling the chamber with nitrogen in order to obtain anaerobic conditions, it is equally satisfactory to add to the Ringer's solution potassium cyanide, or hydrocyanic acid, in concentration of 0.001 normal. These chemical agents exert a specific inhibitory action on oxygen consumption without apparently injuring the cells appreciably or affecting them in any other way. All oxidative processes cease, the tissue is virtually under anaerobic conditions, and the lactic acid production goes on at exactly the same rate as if the tissue were under the most complete anaerobiosis, even though actually it is in the presence of 95 per cent. oxygen.

Table I gives typical results obtained by Warburg[17], applying his method to various kinds of tissue. The column headed Q_{O_2} refers to the number of cubic millimeters of oxygen consumed per hour by one milligram of tissue, the weight of the tissue being obtained after thorough drying in an oven at 100°C. for several hours. $Q^{N_2}_{CO_2}$ refers to the number of cubic millimeters of carbon dioxide produced anaerobically per hour by one milligram of tissue. As already explained, this is simply an indirect way of expressing the amount of lactic acid formed from glucose. This lactic acid reacts with the bicarbonate of the Ringer's solution liberating an equivalent amount of carbon dioxide, and for convenience the lactic acid production is expressed in terms of this carbon dioxide.

$Q^{O_2}_{CO_2}$ refers similarly to the amount of carbon dioxide liberated by lactic acid production under aerobic conditions. The carbon dioxide produced *directly* by the oxidation of glucose to carbon dioxide and water is not included in this figure. In Warburg's most recent papers he uses the symbol $Q^{N_2}_{M}$ instead of $Q^{N_2}_{CO_2}$, and $Q^{O_2}_{M}$ instead of $Q^{O_2}_{CO_2}$, but these new symbols have exactly the same meaning, the M standing for "Milchsäure" and thus serving as a reminder that "Milchsäure" (lactic acid) is what these figures really represent.

TABLE I

Tissue	Q_{O_2}	$Q_{CO_2}^{O_2}$	$Q_{CO_2}^{N_2}$	*Glycolysis* Respiration	U
Liver	11.6	0.6	3.3	0.05	—19.9
Embryo	10.0	1.1	20.0	0.1	0.0
Benign tumors	5.2	4.6	14.0	0.9	+ 3.6
Rat carcinoma	7.2	25.0	31.0	3.9	+16.6
Chicken sarcoma	5.2	19.4	29.7	3.9	+19.3
Human carcinoma	5.1	14.0	21.0	3.1	+10.8
Blood leucocytes	4.4	1.8	11.6	0.4	+ 2.8
Exudate leucocytes	4.4	14.3	21.0	3.3	+12.2
Retina	30.7	45.0	88.0	1.5	+26.6

It will be seen from the table that all the tissues studied have about the same amount of oxygen consumption, with the exception of the retina which will be discussed further on. Turning next to the aerobic glycolysis ($Q^{O_2}_{CO_2}$), one may note that whereas normal resting tissues and embryonic tissues produce little or no lactic acid in the presence of oxygen, benign tumors produce as a rule somewhat more, and frankly malignant tumors produce a large amount of it. Under anaerobic conditions ($Q^{N_2}_{CO_2}$), normal resting tissues produce scarcely more lactic acid than in the presence of oxygen, but embryonic tissues and malignant tumors produce a large amount.

A tentative classification of the different types

of tissue according to their metabolism may therefore be made as follows:

	Respiration	*Aerobic Glycolysis*	*Anaerobic Glycolysis*
Normal resting tissue	Moderate	Small	Small
Embryonic tissue	"	Small	Large
Malignant tumors	"	Large	Large
Benign tumors	"	Similar but less active glycolysis	

This classification, while true in the main, does not fit all cases. In looking for some simple numerical ratio which would express the difference between normal and malignant tissue, Warburg evolved the idea of comparing the magnitude of the aerobic glycolysis with that of the oxygen consumption. This ratio is given by the figures in the fourth column of Table I. It will be seen from inspection of these figures that the glycolysis-respiration ratio for normal and embryonic tissues is a small fraction of 1, whereas that of benign tumors is approximately 1, and for malignant tissues usually 3 or 4.

Warburg himself discovered[21] that one tissue of the body has a most peculiar metabolism, quite unlike that of other normal tissues; that tissue is the retina. Not only does the retina have a tremendous oxygen consumption, but in addition its aerobic and anaerobic lactic acid production are far greater than that of the most malignant tumor. The glycolysis-respiration ratio is also like that of a malignant tumor. No very satisfactory explanation of this phenomenon has yet been offered, but in view of the highly specialized function of the retina it is perhaps not too surprising that it should also possess a unique metabolism. However, the behavior of the retina prevents one from stating too dogmatically just what the fundamental difference is between the normal and the tumor metabolism.

White blood cells also show an anomalous, though less striking behavior towards glucose. As early as 1877 Claude Bernard[43] showed that after blood is withdrawn from the body its sugar content gradually but steadily disappears until there is practically none left. This property resides in the blood cells, being absent from plasma or serum[44]. Maclean and Weir[45] in 1915 separated the blood cells as well as they could into a red cell and a white cell fraction and showed that, cell for cell, the leucocytes are from 200 to 1000 times as active as the erythrocytes in destroying sugar. Levene and Meyer[46] had already shown that leucocytes suspended in a buffered glucose solution used up the glucose with the formation of lactic acid. Numerous other investigators[47] have since demonstrated that the phenomenon of glycolysis in blood is essentially a splitting of glucose to lactic acid. Incidentally, since the white blood cells are so much more active in glycolysis than the red blood cells, an increase in the white blood cell count, such as occurs in leukemia, produces a striking increase in the glycolytic rate of the blood[45, 48]. Warburg's studies on tissue glycolysis stimulated anew the interest in the glycolysis of blood, and hence a number of investigations of the metabolism of leucocytes have recently been made, using Warburg's method[49, 50]. The figures given in Table I are those of Fleischmann and Kubowitz[50] for blood leucocytes of geese and exudate leucocytes of rabbits. While the figures are somewhat conflicting, it seems clear that the metabolism of leucocytes resembles that of embryonic tissues or of tumors much more than that of normal tissues.

Murphy and Hawkins[51] repeated Warburg's work and obtained practically the same results with the same tissues. When they tested other tissues, however, they found that Warburg's original classification did not fit for a number of these. Thus on the basis of the glycolysis-respiration ratio rat placenta fell well within the malignant tumor group. The results with spontaneous tumors of mice were variable. Grouped on the basis of their type of metabolism some of them behaved as embryonic tissue, although the majority acted as if benign tumors, and only a very small number could be classed from their metabolism as malignant. Yet histologically all of these tumors were typically malignant and they were also malignant in their growth behavior.

A further finding of Murphy and Hawkins was that the glycolysis-respiration ratio seemed to bear no definite relationship to the growth rate, such as might be expected from Warburg's work. They showed that a very slow-growing, or actually retrogressing, chicken tumor often gave as high a ratio as the tumors which grew rapidly; while rapidly progressing spontaneous mouse tumors frequently gave a low ratio and slow-growing ones sometimes gave a relatively high ratio.

From a study of his own and Warburg's results, Hawkins[12] concluded that the anaerobic lactic acid production (anerobic glycolysis) of tissues is much more truly a function of their growth rate than is the glycolysis-respiration ratio of Warburg. A classification of tissues on the basis of anaerobic glycolysis was practically free from the inconsistencies noted, malignant tumors showing the greatest anaerobic lactic acid production, benign tumors and embryo tissue coming next, and finally normal adult tissues. It has since been shown[42] that very young embryos produce just as much lactic acid anaerobically as do the most malignant tumors, but this is to be expected if the anaerobic lactic acid production be a function of the growth rate as Hawkins maintains.

Not satisfied with this conception, Warburg has lately devised a new method of classification[39]. Mention has already been made of the fact that in muscle the oxidation of one molecule of lactic acid appears to furnish enough energy to cause several other molecules of lactic acid to be turned back into glucose. The same thing

holds for other tissues of all kinds. The reason why cancer tissue can produce lactic acid in the presence of oxygen is that the ratio of lactic acid production to oxygen consumption is so great that the oxidative processes are unable to furnish enough energy to transform any great part of the lactic acid back into glucose. In embryonic tissue, the lactic acid production being usually somewhat smaller and the oxygen consumption somewhat greater, the oxidative processes furnish just enough energy to cause the disappearance of practically all the lactic acid under aerobic conditions. While in normal tissues, which produce little lactic acid under any conditions, the oxygen consumption is usually far more than sufficient to prevent anything more than a trace of lactic acid from accumulating under aerobic conditions.

It has been found that not only in cancer tissue, but also in the case of muscle, of white blood cells, of embryonic tissue, and even of lactic acid forming bacteria, the consumption of one molecule of oxygen causes the reconversion of between one and two molecules of lactic acid into glucose,—never less than one or more than two[17]. This reaction is known as the Pasteur reaction. Warburg believes that under ideal conditions the Pasteur reaction functions at its maximum, in which case exactly two molecules of lactic acid are suppressed for each molecule of oxygen consumed. He also believes that under the conditions of his experiments the Pasteur reaction is likely to vary greatly, being very sensitive to slight changes in external conditions. He proposes, therefore, to calculate what the aerobic glycolysis ought to be under ideal conditions, by starting with the lactic acid production under anaerobic conditions, then determining the oxygen consumption of the tissue in 95 per cent. oxygen, and subtracting from the anaerobic lactic acid the amount of lactic acid which ought to be reconverted into glucose under ideal aerobic conditions, that is, two molecules of lactic acid for each molecule of oxygen consumed. This figure he calls "U". It really represents what the aerobic glycolysis ought to be under ideal conditions. Of course, if the oxygen consumption is more than enough to balance the lactic acid production, U becomes a negative quantity. As Cannan[17] says, the chief merit of U is that not only theoretically but also actually it seems to be in large measure independent of variations in the experimental conditions. "Thus a rat embryo gave in Ringer's solution a high rate of aerobic glycolysis but in serum a very low rate. The old classification failed to eliminate this difference, whereas in the new we find that the values of U for a rat embryo in Ringer's solution and in serum are of the same order".

As will be seen from an inspection of the last column in Table I, normal tissues have negative values of U, embryonic tissues have values of approximately zero, while carcinoma and sarcoma cells always give positive values. What this classification means, in effect, is that in normal tissues the unrestricted operation of the Pasteur reaction is sufficient completely to prevent the appearance of lactic acid, whereas in malignant tissues there is always an excess of lactic acid production over what can be inhibited by the action of oxidative processes.[17] The retina and the red and white blood cells remain exceptions even under this classification.

The significance of Warburg's figures for glycolysis, averages of which have been given in Table I, would be more readily appreciated if the lactic acid production were expressed as such, instead of in terms of the carbon dioxide driven off from the Ringer's solution by lactic acid. As a matter of fact it is easy to convert one set of figures into the other, since one gram-molecule of lactic acid drives off one gram-molecule of carbon dioxide, one cubic centimeter of carbon dioxide being therefore equivalent to 0.004 gm. of lactic acid. Hence to find the lactic acid production or the sugar consumption it is only necessary to multiply the amount of carbon dioxide by 0.004. The remarkable fact, then, appears that malignant tissue, such as rat carcinoma for example, ordinarily produces about 10 per cent. of its dry weight of lactic acid in an hour, even in the presence of oxygen. Thus in ten hours a tumor destroys its own dry weight of glucose, converting it into lactic acid. Normal tissues produce practically no lactic acid as a rule, although exceptionally values as high as 3 or 4 per cent. are obtained, as for example in rat testes. It should be emphasized however, that these latter figures are very exceptional, so that for all practical purposes it may be said that whereas malignant tissue produces one-tenth of its dry weight of lactic acid per hour, normal tissue, with the exception of the retina and the blood cells, produces almost none by comparison.

The retina has admittedly the most extraordinary metabolism of any tissue. Rat retina produces anaerobically 35 per cent. of its dry weight of lactic acid per hour, and aerobically 16 per cent. The retina of the hen produces as much as 55 per cent. of its dry weight of lactic acid per hour anaerobically and that of the pigeon actually splits 84 per cent. of its weight of glucose in an hour[40]. These figures were obtained with isolated retinal tissue in Ringer's solution. Possibly in its natural surroundings the retina behaves differently.

Warburg has calculated that malignant tissue produces 200 times as much lactic acid as frog muscle at rest, and eight times as much as frog muscle at the limit of normal working efficiency. This does not mean, however, that malignant tissue uses up any more energy than normal tissue, or that an animal having even a large tumor will have an increased metabolism. Assuming that in the body tumors form lactic acid from glycogen, Hawkins[12] calls to mind

the fact that the heat of combustion of one gram of glycogen in dilute solution is 3836 calories, whereas the total heat liberated in the formation (and neutralization) of one gram of lactic acid from one gram of glycogen is only 373 calories, or roughly one-tenth as much. Therefore, in order to obtain all its energy by splitting glycogen to lactic acid, a tissue must consume ten times as much glycogen as if it were to oxidize it to carbon dioxide and water. This explains why tumors use up such large amounts of sugar. Their energy metabolism, as calculated by Hawkins, is not appreciably greater than that of normal tissues. It is to be to noted that Warburg's statement that malignant tissue produces 200 times as much lactic acid as frog muscle does *not* imply that it uses up 200 times as much sugar, since only a small portion of the sugar used by the muscles is changed to lactic acid.

Since tumor cells can obtain their energy by the splitting of glucose into lactic acid, a process which requires no oxygen and is indeed accelerated by the absence of oxygen, one naturally wonders whether malignant tissue can live for any considerable time, or even grow, under strictly anaerobic conditions, as certain bacteria and yeasts are able to do. If this were true, it would be a fact of fundamental importance in the understanding of malignant growth. Okamoto[22], working in Warburg's laboratory, set out to determine whether or not transplantable animal tumors kept under anaerobic conditions for a few days still retained the power of forming new tumors when inoculated into animals. For this purpose tumor slices a few tenths of a millimeter in thickness were placed in a large volume of Ringer's solution, or serum, and kept under an atmosphere of 95 per cent. nitrogen and 5 per cent. carbon dioxide for one or more days, and then transplanted. The result of transplantation showed whether the tumor was alive or not. The metabolism was also followed.

Okamoto found that Flexner-Jobling rat carcinoma can live for 24 hours without oxygen, if it is well supplied with glucose. Even the addition of 0.001 normal hydrocyanic acid, which completely inhibits respiration were there any oxygen to respire, does not kill the carcinoma tissue. But if deprived of both oxygen and glucose, the tissue quickly dies. It can also live for 24 hours if supplied with oxygen but no glucose. Jensen rat sarcoma can live for at least five days without oxygen, being apparently unaffected by oxygen lack. Histological sections confirm the fact that the tissue is uninjured, as do glycolysis determinations, the rate of lactic acid production slowly decreasing, but decreasing *more* rapidly under aerobic than under anaerobic conditions. Rous chicken sarcoma also lived after three days' anaerobiosis. Control experiments with slices of liver showed that this tissue was killed and made necrotic by similar treatment, as determined by the appearance of sections examined under the microscope. In a certain sense malignant tissue has an advantage over other tissues in that it can survive in the absence of oxygen. In order to kill malignant cells it is necessary not only to asphyxiate them but also to starve them. Moreover, these cells can actually grow under anaerobic conditions in tissue cultures. A Rous chicken sarcoma culture tested by Wind[28] grew for 48 hours in an atmosphere from which the last trace of oxygen had been abstracted by the combustion of phosphorus, and it could be transplanted under such conditions twice more before it died.

Leucocytes, which have a metabolism somewhat resembling that of tumor cells, can also live under anaerobic conditions. Fleischmann[52] reports that when cell respiration is fully inhibited by m/200 HCN, glycolysis, phagocytosis, and ameboid motion of leucocytes from blood as well as from peritoneal exudate are fully retained. Fleischmann therefore refers to a "facultative anoxybiosis" of leucocytes. If the splitting of glucose into lactic acid is also prevented, by addition of sodium fluoride, the leucocytes have no means of obtaining energy and die.

The question may be raised whether the peculiar metabolism which Warburg has discovered for tumor tissue is of any significance as regards tumors within their normal surroundings,—the animal body. It might happen that the lactic acid production demonstrated by Warburg was the result of depriving the tumors of their blood supply, cutting them into slices 0.2 millimeters thick, suspending these slices in an artificial medium, and otherwise injuring them so that their metabolic activity bore little resemblance to the normal processes as the tumors grow in the body. The same question has been raised in regard to the glycolysis of blood, and a number of investigators believe that blood glycolysis is essentially an abnormal phenomenon associated with the death of the cells. Stuber[53] even goes so far as to call the lactic acid production of the cells of drawn blood "the rigor mortis of the blood". No one knows whether the blood cells in the body produce lactic acid the way they do in blood withdrawn from the body.

In 1923, when Warburg published the results of his first experiments upon tumor metabolism, three investigators in Tokio, Tadenuma, Hotta, and Homma[54], apparently independently of Warburg, published a paper reporting that the venous blood from the wing of a chicken upon which a sarcoma was growing contained consistently less sugar than the venous blood from the other wing, which did not bear a sarcoma. They concluded that the consumption of blood sugar by chicken sarcoma is measurably great. They also found that raising the blood sugar level increased the sugar consumption of the tumor. This is in agreement with the later

reports of Warburg, who found that the sugar consumption was greater, the higher its concentration in the Ringer's solution. In order to provide standard conditions, Warburg always used 0.2 per cent. of glucose in his Ringer's solutions.

Two years later, Cori and Cori[55] reported more elaborate experiments of the same general nature. They found that the tumors studied, namely spontaneous and transplanted mouse carcinoma and Jensen rat sarcoma, showed without exception a low free sugar content as compared with all the normal tissues which were tested. After glucose administration with a consequent marked rise in blood sugar, the free sugar content of the tumors rose from 0.051 per cent. to about 0.250 per cent., while the lactic acid content, which was also low under ordinary conditions, rose from 0.034 per cent. to 0.137 per cent. They concluded that probably a very low free sugar content is characteristic of malignant tumors in general. The low lactic acid content of the tumor under ordinary conditions was thought to be due to rapid elimination of the lactic acid, as fast as formed, into the blood stream. An analogous situation occurs during insulin convulsions or after epinephrine injections into normal animals, when a marked increase in the lactic acid of the blood occurs, while the muscles and liver, which are undoubtedly the source of this increase, show a normal lactic acid content. Hence the low lactic acid content of tumors of fasting animals need not be taken as a contradiction of Warburg's experiments. After glucose injection, on the other hand, Cori and Cori[55] showed that the free sugar concentration of the tumors was greatly increased and this resulted in such an excess of lactic acid that the blood stream could not carry it all away. This finding again agrees with Warburg's *in vitro* experiments in which the rate of glycolysis of tumor slices was increased with increasing glucose concentration.

Cori and Cori[56] then proceeded to repeat the experiments of Tadenuma, Hotta, and Homma and found that blood which had passed through a sarcoma on one wing of a chicken contained on the average 23 milligrams less sugar and 16.2 milligrams more lactic acid than blood which had passed through the normal tissues of the other wing. They also studied a patient who had a large sarcoma upon his forearm, the vein from which could be easily punctured. In this case again they found consistently less sugar and more lactic acid in the blood which had passed through the tumor than in blood from the corresponding vein of the other arm. Similar experiments are reported by Warburg, Wind, and Negelein[30], who found that whereas normal venous blood contained no more lactic acid than arterial blood, in ten experiments on rats with Jensen sarcoma the lactic acid content of the venous blood coming from the tumor was greater by 11 to 209 milligrams per 100 cubic centimeters than that of the arterial blood, the average difference being 46 milligrams. Normal tissues, likewise, removed only 2 to 18 milligrams of glucose per 100 cubic centimeters of blood, while Jensen rat sarcoma removed 48 to 95 milligrams. The tumor thus took on the average 70 milligrams of glucose from 100 cubic centimeters of blood and returned 46 milligrams of lactic acid to the same amount of blood. Thus 66 per cent. of the glucose was changed to lactic acid, and the remainder was probably oxidized in the normal manner. The glucose consumption of a tumor was doubled in one case by raising the arterial blood sugar to 0.342 per cent. This is in agreement with the findings of Tadenuma, Hotta, and Homma, and of Cori and Cori, already mentioned.

Warburg[38] next attempted to kill the tumors by depriving them of sugar. This seemed a possibility inasmuch as their oxygen supply, as he calculated it, was rather inadequate even under the best of conditions. Tumor-bearing animals were, therefore, kept for hours in insulin convulsions, and then the vitality of the tumors was measured by testing their glucose metabolism. The results of these experiments were negative. Warburg[38] then tried the converse experiment, namely depriving the tumor of oxygen. He believed that this might be successful in killing a part of the tumor because, according to his calculations, the part of the tumor supplied by venous blood has at all times a very poor sugar supply, not enough to sustain life, most of the sugar being supposedly removed from the blood by the portion of the tumor supplied by arterial blood. Under low oxygen tensions, therefore, the tissue supplied by venous blood would receive neither sugar nor oxygen enough to support life. A rat bearing a tumor was placed in a gas mixture containing 5 per cent. oxygen with a little ammonia to prevent acidosis; the oxygen saturation of the blood was thus lowered so that theoretically only the arterial portion of the tumor was supplied with oxygen. After 40 hours the animal was killed and the metabolism of the tumor found to be practically zero, except for a thin outer shell which was normal. This result was so much more satisfactory than had been expected that Warburg was somewhat at a loss to explain it. He was forced to assume that the venous portion of the tumor had first been killed as planned, and that had so blocked the capillaries that most of the arterial portion had also died. A similar state of affairs occurs with yeast, which lives anaerobically by fermentation, for it can be killed through want of oxygen if the sugar required for fermentation be lacking.

It might be supposed that tumors would raise the lactic acid content of the systemic blood sufficiently to be easily detected, but such is not the case to be of any diagnostic value. Observations on the blood lactic acid in cancer patients have been made by Valentin[57], Büttner[58], Schu-

macher[59], and Mendel and Bauch[60]. Some of these investigators have obtained slightly higher values for the lactic acid content of the blood from cancer patients than from normal persons. Cori and Cori[56] found that in animals an increase of the blood lactic acid could be demonstrated only if the tumor constituted 13 per cent. or more of the body weight, and then only after lactic acid production in the tumor had been greatly increased as a result of glucose administration. They explained their results on the basis that the lactic acid content of the blood remained normal until the amount of lactic acid constantly entering the blood surpassed the capacity of the liver and muscles to withdraw it.

This hypothesis was confirmed by Mendel and Bauch[60], who injected lactic acid into the veins of dogs at the rate of 0.2 gram per minute and could detect no increase whatever in the blood lactic acid after this injection had been kept up for six minutes. They raised the question, "How large must a carcinoma be in order to produce as much as 0.2 gram of lactic acid per minute?" If the tumor produced lactic acid at the rate of 10 per cent. of its dry weight per hour, it would have to weigh 600 grams (fresh weight), or about one-twentieth of the body weight of the dog used in their experiment. Even then a tumor of that size would not raise the blood lactic acid.

Warburg's type of experiment lends itself to a variety of uses. Yabusoe[61] has utilized the metabolic rate of slices of Flexner-Jobling carcinoma to determine the toxic effect of a number of aniline dyes upon carcinoma. He found various degrees of inhibition of glycolysis but no strikingly specific action on the part of any dye tested.

Krebs and Kubowitz[41] have used metabolism experiments to test the theory of Freund and Kaminer. If normal serum actually contains a substance which destroys cancer cells, then slices of cancer tissue ought to show a much lower metabolism in normal serum than in the serum of cancerous individuals. Such an effect was sought for, using human carcinoma in normal and cancerous human serum, Jensen rat sarcoma in the corresponding rat sera, and Rous sarcoma in the serum of chickens with and without tumors. The results were entirely negative. This would suggest that the Freund and Kaminer cytolytic reaction, which these authors consider rather specific for cancerous serum, depends particularly on the cancer cells being fragile before the serum to be tested begins to act upon them. In the test the cancer tissue used is ground to a pulp and treated with sodium fluoride so that the cells are injured before the test is made.

Warburg does not make any claims for the correctness of his theory of the origin of malignant growth[17]. He "regards a tissue as a community of cells having wide individual differences in their respiratory and fermentative activities. Thus some few of the cells of a normal tissue will have all the metabolic characteristics of neoplastic cells. In the economy of the whole tissue their high fermentative activity will make no significant contribution owing to their very limited number. Should, however, a local condition of chronic anoxemia occur, the majority of the cells will be killed, since they will be unable to respire, but the few cells which possess sufficient glycolytic activity to derive the energy they require from fermentative activity will survive, proliferate, and from them will develop a malignant growth." Here we have a new application of the principle of the survival of the fittest. "Thus cancer cells are regarded as present in all normal tissues, and the exciting cause for their exclusive proliferation is held to be a sustained local lack of oxygen. 'Irritation' becomes 'anoxemia'. This highly interesting view remains, at present, without direct evidence in support or denial. It can only be regarded as a novel and suggestive hypothesis which should stimulate investigation."

Of the three problems which have been presented, none is yet solved. The relation of vitamins to cancer remains problematical. The presence in human serum of specific substances which either importantly inhibit or favor the growth of malignant cells remains doubtful. Much more is known concerning the metabolism of malignant tissues. It is definitely established that they utilize carbohydrates in a manner strikingly different from that of most normal tissues. The fundamental significance of this difference is, however, entirely a matter of conjecture.

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THE "COMPLAINT" AS THE CENTER OF GENETIC-DYNAMIC AND NOSOLOGICAL TEACHING IN PSYCHIATRY*

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WHEN your president honored me with his invitation to address you this evening, I was just in the midst of a task of making adjustment of psychiatric teaching to a system of an eight hour third-year course instead of one of eleven hours, and that with our small and special material at the Phipps Clinic. With the difficulty involved in this attempt at condensation, the old associations naturally led me to compare the teaching by demonstrations of those whole groups of patients on Ward's Island and at the Worcester Hospital, twenty and thirty years ago, with the very different conditions of the present day in a clinic to which only voluntary patients are admitted.

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†For record and address of author see "This Week's Issue," page 389.

TEACHING WITH THE EARLIER ESSENTIALLY CLASSIFICATORY PSYCHIATRY

I could not help thinking of the profound changes (for which I probably have my share of responsibility)—the change from interest in more or less set diagnoses to an interest rather in an understanding of the case, the growing inclusion of child psychiatry, and the development of psychopathology and extra-mural psychiatry, the rise of social psychiatry, and the corresponding demands in teaching. For a long time the main question of psychiatry had been whether the patient was or was not insane, partly because of the rule that a State institution should take over from the community only the "really insane patients." The next kind of question was that of classifications (which is, of course, always the *first* step towards orientation) and

the introduction of the so-called *Kraepelinian classifications,* in which I had my share, although from the very start I personally urged that we relieve the rigid demand for a categorical *yes* or *no* by providing for the merely "allied" cases, incomplete or complicated by admixtures not belonging to the more really specific type which figured as "the disease entity." During my connection with Cornell Medical School, the remarkable resources of the Manhattan State Hospital allowed of the presentation at any one time of nearly all the desirable and essential varieties of each disease or main topic; and the "Notes of Clinics" brought out with Dr. Kirby still arouses in me a feeling of envy when I compare with the variety of types of each disorder the limited choice and greater difficulty of demonstrations in my present setting. There certainly is real cause for envy in the relative *simplicity* of work with what we might call *seasoned* cases, in contrast to the patients who by their largely voluntary character constitute mainly what then would have been called borderland cases with frequent sensitiveness about presentations, especially when the study and treatment have already touched the personality rather deeply. There was as a rule little difficulty in getting enough patients from perfectly clearly defined categories for a clinical demonstration; and while I never took much stock in set groupings, I did not have to worry much about the cases being true to type as far as they went.

To-day there is almost a complete change of front. We are trying to teach the student psychiatry not for the sake of classification and classificatory diagnosis, but rather in order that he may learn to appreciate the personality problems of the rank and file of his cases *throughout medicine,* in any of the medical branches and not only in psychiatry proper. His attention is turned to what one can work on, with and for, the *patient.* One naturally meets patients who may have to be looked upon as final and unquestioned representatives of those classical entities which one may have to surrender largely to classification in large institutions; but in all cases the practical and scientific interest of the teaching goes fully as much in the direction of mental hygiene and mental "pathology and therapy" as in the direction of the study and terminal explanation for classification and autopsy work—in those early days all that was considered real pathology. We have reached a stage of definitely greater interest in genetic-dynamic rather than nosological problems. To be sure, the rank and file of physicians remain sensitized to but a few questions. They want to know whether the case is a psychoneurosis (with psychasthenia as a welcome blanket for whatever one wishes to exempt from recognition as a real psychosis); and when even the mind-shy has to admit the existence of a frank psychosis, one hears of but three ever-returning questions: Is it organic and a case of paresis? or manic-depressive? or dementia praecox (unless perhaps in more tender-minded polite society the latter is called "schizophrenia")? By this, the questioner does not really show any interest in much more than an intimation of an ultimate prognosis. I wonder how soon we shall be far enough along to have the physician ask: How much and what, if anything, is *structural?* how much *functional, somatic* or *metabolic?* how much *constitutional, psychogenic* and *social?*

CHANGES IN THE PRACTICE OF PSYCHIATRY

There is another change, too, that has taken place. The practice of psychiatry, as far as it could be carried on outside of closed and licensed institutions, then belonged almost altogether to the neurologist. To-day psychiatrists and some neurologists have created an intermediate group —that of the psychotherapeutists, a very small group in the days when hypnotism, electrotherapy and persuasion were the main equipment, but to-day the haven of many aspirations, and indeed one in which even the lay worker and the psychologist without medical training will feel themselves supremely confident, unless the competently medically trained persons can take care of the demands. To be sure, the extra-institutional care of the psychopathic and psychotic patients still is largely in the hands of "neurologists" because of the odium which is attached to the psychiatrist by tradition, and many of these neurologists have had no real psychiatric training. Moreover, child psychiatry creates its own sets of workers. There evidently are definite changes inside and outside the ranks of the "psychiatrists" in the best and broadest sense of the word, and these changes affect the goals of teaching and the demands for teaching.

From the teaching point of view in America, in contrast to what holds in German universities, psychiatry and neurology are usually separated and neurology usually part of what we call "medicine." At Johns Hopkins, the separation tends to be one into the outspokenly neurologic-organic field on the one hand, and the psychopathologic-psychiatric field on the other. There is no tendency to quibble in practice over any overlapping; but very definitely in the teaching and research interests a tendency towards including in the field of psychiatry those so-called neuroses which present no localizing and structural-functional problems, but largely *personality problems.* Neurology handles the nervous tissues and their localizable functions as far as they do not reach too directly into the psychopathologic field, as is partly the case with the aphasias and apraxias, and usually with paresis and other diffuse disorders which also implicate the personality functions. The two fields should be close together and the staffs should have much conjoint training—not unlike the relation between gynecology and obstetrics.

The teaching varies correspondingly in differ-

ent places, both as to scope and form. There may be places in which neurology frankly absorbs everything that refuses to be called an asylum case; other places in which psychoanalysts and psychopathologists take hold of the voluntary patients and leave only the more unco-öperative psychoses to the psychiatrist.

With the rise and growth of functional pathology throughout medicine a very largely genetic-dynamic method of approach as opposed to the orthodox nosological teaching of diseases has established itself. The question arises: How do the scheme of teaching and the doctrine shape themselves under such conditions? Dr. Southard once paraphrased an address of Dr. Welch on Medical Education in America as "American Medical Education with the report of one case." I come frankly with the desire to report merely our own case, in the hope that others will come forth with different ones.

PRECLINICAL TEACHING

With us, psychiatry lays its own preclinical foundations.

In the first year, while the student is being led to dissect the corpse and to study the physiology offered on ground of animal experimentation, there is given a course of eight hours of class work, each of these hours followed by an hour of group discussion, devoted to what I call psychobiology, and each student is under obligation to work out a personality-study of a concrete person, preferably himself or herself, with the avowed purpose of obtaining a picture of "the live human *organism*" studied as a *personality*. Answering the successive topics of the personality-questionnaire, the student organizes the traditional common-sense knowledge of man into critical common sense and mobilizes actually experienced material for the successive discussions. Not that we are able to overcome altogether the feeling of some of the students that the old doctors got along without such a course; but there is a growing realization that there is a need of organized familiarity with what otherwise becomes a prey to the non-medical healers. Since actual experience is clearly called for in the handling of many a patient, the personality-study is as important a part of the preparation in medicine as the dissection of a corpse, and naturally, to my mind, a very essential supplement of the ordinary training, especially in view of the phenomenal reduction of interest in humanistic training in the premedical work and in much of our type of civilization.

In the second year, when the other branches of medicine begin to initiate the student into the art of physical diagnosis and work with patients, an introductory course in examining psychiatric cases is given, to extend the experience already gained so as to serve in any so-called mental status or examination. The course furnishes a good drill in work on four or six clear and well-studied contrasted cases.

Through the work in the second year the student is already primed with regard to a number of terms and topics with which our psychopathology and practical work operate.

CLINICAL TEACHING

In the third year work, each student spends 16 forenoons in the dispensary, and in the first quarter of the year the class as a whole receives the eight hours of demonstrations and discussions on which I want to base my present discussion of the type of teaching. In the fourth year the student has to hand in at least 6 records of cases examined and discussed under supervision. I want to discuss especially the third year demonstration course.

In order to have the essentials clearly before the student, I hand out a sheet which summarizes certain essentials of facts and terminology in a form that also suggests how each case should be considered after the routine examination is complete and before one passes it as disposed of. I shall take the liberty of distributing this memorandum so as to facilitate the following of the discussion.

The actual third year work of the student lies in the personal study of cases and in going to the trouble of seeing the problem through to the point of action. In connection with the specific discussions the student has at his disposal folders with detailed, not as yet printed, discussions of the reaction-types with a selection of case records furnishing concrete examples and especially also a perspective of what one has a right to expect—the time and patience things take, and the work and judgment involved.

There is no doubt that for many students it is too much to expect that they develop breadth and dependability of sizing up human problems with full medical responsibility in the short period of two forenoons a week for eight weeks, and from examining six cases in the fourth year, because many have to outgrow a mass of prejudices and others have too many difficulties in handling in an effective and orderly way the many points a psychobiologic problem contains and demands attention for. Yet if there is an option between showing the student some life-facts or, on the other hand, largely giving him a scheme of classified diseases to pass written examinations, I feel the former is safer for the patient and for the reputation of medicine.

The discussion of special procedures is left to elective courses.

When we later come to the more advanced student, let us say of the grade of interne, the opportunity given is naturally more commensurate with the task, since each physician with us has only from 8 to 13 patients and the duty of working out the material with the patient and with the more advanced staff members, and of doing the necessary reading, etc.

GENERAL BEHAVIOR AND MOOD

Overactivities: — *Composed* or *Neutral States* — *Underactivities:*

Excitement — Agitation — With or without rapport — Depression — Stupor

Hyperthymergasia — Excessive ease — Inhibition — Hypothymergasia
Aggression and Disturbance problems — *Essentially pure affects* — Suicidal and Nursing problems
Elation — Sadness
Anger — Anxiety

Other Affect Types

Fear — Tenseness — Fear
Suspicion — Panic Risks — Suspicion
Hate — Compulsions — Hate

Oddities, Mannerisms and Impulses
Indifference
(Para group or Dys group)
Evidence of Defect
(Anergastic or Oligergastic)

CONTENT AND FORM PROBLEMS

Merergastic
(Emotionally unstable or anxious) part involvement

Hypermnesic (Hypochondriacal — obsessive) — Dissociative — Dysmnesic (Hysterical)

HOLERGASTIC REACTION SETS:

Exaggerated self-feeling — Depressive self-absorption
Flight — *Thymergastic* — Slowing
Distractibility — With thinking difficulty — Preoccupation
Subjective power — Depressive topics

Perplexed
Catathymic (set, complex-determined)
Topical systematized (paranoic and paranoid)
Topical unsystematized (delusional or hallucinatory or both)

Parergastic

Scattering — With incongruities, fantastic or passivity projections — Strained

If with *disorders of orientation, memory and judgment:*
Delirious-dysergastic
(Disorientation, hallucinations, dreamy situations and fears)

With actual *defect traits*

Fits and contractures — *Anergastic* — Palsy and Coma

(Loss of memory and judgment)
Organic-structural or Organic-functional or Functional-mental (amnesias with fits)?

TYPE AND DEPTH OF CONTENT DISORDERS

Elaboration turning on

Self (auto- and somatopsychic) — Situation — Projection (allopsychic)

Substitutions

Suppression and Dissociation — Distortion — Compensation or Regression

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COURSE

Episodic — Phasic (in attacks) — Progressive
Acute — Subacute — Chronic

With or without fixation, or changeable (regularly or irregularly)
Stationary or Progressive or Adjusting
Dementing

CAUSAL FACTORS AND PROCESS

Exogenic — Somatogenic — Neurogenic
Psychogenic (traceable to experience) — Constitutional (inherited or at least ingrained)

MATERIAL PRESENTED IN A COURSE

I give you first a bird's-eye view of the cases presented before the third year class during the quarter just ended and we shall then go over the memorandum.

I began the course with cases in which the physician meets a reasonably understanding collaborator in the patient, in contrast to those in which, owing to more sweeping disorder, the trouble disturbs and includes the very functions and qualification for collaboration.

We thus started with patients who consider themselves like any other patient who goes to a physician, not unlike those who constitute the bulk of the dispensary patients and the office clientele of many specialists: the persons who come with complaints for which they seek medical help. The distinction recognizes the practical contrast between the "minor" psychoses and "major" psychoses, or the so-called neuroses and "major" psychoses, or the so-called neuroses and psychoses. But the difference is not as great as it is made out to be in some quarters where the psychoneuroses and the psychoses are supposed to be strictly separated, as is customary in England.

I began with a woman of 52, who had willingly or unwillingly spent 20 years of her married life in the home of her husband's mother, and around the menopause made an heroic venture to start her own household, and then had the misfortune of undergoing some abdominal operations with possibly inadequate after-care, which furnished an occasion to develop an invalidism with very disturbing hypochondriacal reactions to the mismanaged post-operative difficulties dominating much of the life of the patient and the whole household. The emotional instability, with many grotesquely and dramatically used complaints, went with a tremendously unstable galvanic curve under association experiment and questioning.

The second case was one of typical *anxiety attacks* after childbirth. These, on ground of a statement of the husband, were first supposed to be a repetition of recurrent upsets in earlier years (which proved to be genuine gastro-intestinal difficulties). But actually, as the patient claimed, it was only after the birth of a stillborn child that distressing anxiety attacks came on at bedtime when the propinquity of her husband became imminent. There also was a certain amount of general depression in the meantime (and some fear in crossing a street otherwise accounted for). The patient is a Catholic, the husband is a Protestant insisting on contraceptive relations. The pregnancy had been an accident, but became a particularly happy time for the patient; the death of the child was taken for a punishment from God for her yielding to the husband's contraceptive practices. This patient, too, had a very unstable galvanic curve. She could be reported as practically adjusted at the end of the course.

The next case was one of torticollis in the daughter of a physician, with perfectly bland behavior and smooth galvanic curve, and great resistance to the uncovering of very definite personality problems. She is now able to relax but still protecting herself with the hysterical defense reaction against having to meet her responsibilities. In view of the difficulty of coöperation, hypnosis and habit-training and adjustment of the personal attitude are being stressed.

The fourth case was that of a little girl of 11, dragged into sex relations with boys at the age of 9 and soon afterwards afflicted with periods of choreiform twitching and other periods of compulsive exclamations of sex words and substitutive noises, and having at the same time continued escapades of sex indulgence with an adult. This patient was only slightly improved and with meagre assets.

The next case was that of a man with *equivalents* of anxiety attacks (spells of a peculiar warm sensation in the back of the neck with irresistible restlessness, and with an occasional intense hypochondriacal scare over transitory speechlessness, or of having appendicitis or apoplexy)—the philandering husband of a woman with post-operative dyspareunia. He was much improved and returned to his family after adjustment of his sex-philosophy and mode of life and advice to the wife.

Next came a girl of 27, who, after quarreling with her fiancé, had developed an elaborate cult of obsessive behavior, seeing a horrible blind man on her left, and obsessive thoughts and rituals making it impossible for her to use her left side in her activities; but very resistant to treatment, except when placed on an undesirable ward.

Then there was a very intelligent young woman, a victim of a probably psychogenic (or possibly encephalitic?) episode, with an isolated status of five Jacksonian-like attacks and a series of hypochondriacal fears of apoplexy, fits, etc., largely inculcated by physicians who did not realize the suggestive influence of injudicious palaver, and who have so far extracted $5,000 in a year and left her with exhaustion, especially in the afternoon. This patient was largely adjusted by distributive explanation of a number of factors.

Finally, two patients were shown with breathing difficulties: one following a probably psychogenic convulsion five years ago, and the other probably a residual of a poorly marked encephalitis—the two showing clearly the largely structural vs. the purely psychogenic level of disorder and treatment.

With this group of cases there is enough material on which to sense the principal contrasts of reactive tendencies and problems and to bring home the desirable method of procedure: (1) formulation of the *story* and especially also the *normal* assets with which the patient would be

enabled to develop as normal a hospital life as possible; (2) under a wholesome regime of habit-training the working out of the individual somatic and emotional and situational problems.

One thing is certain: few of these cases fit the now too popular idea that all that is needed is to bring a few unconscious facts to consciousness. They are fairly broad and complex personality problems, requiring what we call a distributive scrutiny with readjustment and habit-training. Formally, they present mainly what one might call minor psychoses or part-disorders in contrast to the more sweeping involvement. I shall explain why and how I use the term *merergastic* in contrast to *holergastic* disorders (using for all psychobiologic reactions the term *ergasia,* and *meros, a part,* opposed to *holos, the whole*). In each case we specify the *type of substitution* for the normal, sometimes a pure type, but often mixed.

The next step was a study of:

(1) A patient with a transitory inability to speak, a slight speech disorder, mild expansiveness, moderate memory and judgment defect, no insight, pupil disorders and typical paresis fluid findings;

(2) A patient coming out of a coma incidental to delirium following extraction of teeth and bromide medication; and

(3) A patient with euphoria and memory disorders, arteriosclerosis and pseudobulbar speech and laughing and crying spells, free of syphilis.

Here we have evidently disorders with definite defect or deficit reactions, or difficulty of a transitory character, with largely differing sets of facts, but clearly with a definite principle of lasting or transitory damage of *structure* (anergasias), or at least of the metabolic-circulatory *support* of the brain (a dysergastic reaction set).

This group was followed by the demonstration of a patient in her 27th attack of *depression* now near readjustment, and a young girl in a quieting phase of a not altogether simple *manic excitement* preceded by depressive periods; then *three* men with much more outspoken *depressions,* one in a fourth attack and the other two in first attacks; one of them, the most agitated and atypical one, a member of a family with numerous members with depressions.

Individually and as a group, these five cases present disorders perhaps somewhat more difficult to reconstruct as "experiments of nature," closely related to "pure affect" or depression or elation or overactivity, or "thymergastic" disorders largely of the functioning of the *self* and what depends on it, in contrast to the next group where the patient's feeling of the *situation* is twisted—the para group:

(1) A farmer, father of eight children, with a paranoid state of autochthonous and hallucinatory influence by a machine, ushered in by an entanglement with a prostitute; charging the wife with infidelity and with attempts to poison him, and with having stuck two needles in his brain; and then a morose period with a salvation episode and a catatoniform phase, and now the paranoid control by a machine and a mixture of indifference and impulsiveness;

(2) One case of pseudo-depression with projections in a girl of 21, who stole at high school five years ago, drifted into moodiness and day-dreaming with an impulsive suicidal attempt two years ago, and has had ideas of reference during the last year—evidently parergastic reactions but with fair readjustment under treatment;

(3) Another young girl with day-dreaming and projections and a tendency to sit and stare, *smiling* with depressive talk, incontinence, and hallucinations related to day-dreams about "the fellows," etc.

In all of these there were autoerotic tendencies, but with different assets and problems.

Then (4) a case of primarily depressive *stupor* of nearly two years' duration, and, finally, a series of three shy and seclusive young men with masturbation problems, nervousness, shaking, or actual beginnings of projection, feelings of a brother's causing the nocturnal emissions, mind-reading, etc., i.e., the shut-in make-up with neurasthenoid and parergastic developments.

THE GENETIC-DYNAMIC AND NOSOLOGICAL UTILIZATION

The goal of the demonstrations in this course was, in the first place, that of giving a sense of representative concrete pictures and problems; then the recognition of certain recurrent sets of life-situations and reactions, and the discussion of the pertinent discriminations, interpretations and procedures, and in the main a feeling that one deals with by no means hopelessly unintelligible experiments of nature—events which, when you know the developments, give the feeling "yes, that rings true," "that is just what nature and man will do;" and I might add, it is the kind of thing which with timely knowledge and action might work out much better than when left haphazard.

In these cases the student was led to single out more or less fundamental and distinctive reaction-sets, with the definite suggestion not to use them for a classification of *patients,* but rather for an understanding and orderly presentation of *the essential concrete facts,* to be viewed in the light of the normal assets, the specific working, the general behavior and mood, the content and form problems, the type and depth of the content disorders, the course, and the causal factors and process. In order to keep this viewpoint practically before him from the *outset,* we used the one page table (which you have in your hands) of the points to be borne in mind in the consideration of the data of the examination and

the consideration of the "experiments of nature." There is no advantage in arousing an expectation that we should find just "symptoms" of set "disease entities" that would allow us to dump all the facts of each case under *one term or heading,* which then could at once set the mind of the physician on some stereotyped line of thinking and acting. Such a scheme would be likely to obliterate much of the further interest in the specific data to be used in the patient and for the patient.

Experience prompts me definitely in the direction of keeping the student from surrendering at once to the arch sin of current psychiatry, i.e., blinding oneself to the specific facts in the case at hand by asking at once, "Is it a major psychosis and, if it is, is it manic-depressive or dementia praecox?"

THE GROUPING AND EVALUATION OF THE FACTS AT HAND

To obviate this, I try to direct the attention with all possible insistence to what *actually* is *present* in the complaint and history offered and in that systematic sampling of functions which we call our examination or status praesens. I ask first for the restatement of the "story," and for the specific reactions making clear a special disorder to be accounted for. And in order not to warp the course of observation and interpretation at once by prejudicial terms too commonly used for classification of the whole *patient,* I use a series of essentially descriptive behavioristic terms already referred to, characterizing the performance and reactions of the patient. They are terms but rarely mentioned but, as it were, kept in the back of one's mind. I speak of ergasias, or activities and behavior-reactions, in a broad psychobiologic sense. The term *ergasia* clearly implies activity of the *individual as a person* in contrast to mere physiological part-functions, for which I would rather use the term "*kinesis.*" If I had an English word that could be used for nouns and adjectives as well, I should prefer it. The root *erg* is familiar enough and is the same as "work" or "workings," and is used for the psychobiologically integrated form of functioning. I oppose, for simple practical reasons, *mer*ergastic reactions and *hol*ergastic ones (i.e., part-disorders and sweeping disorders), and among the latter *thym*ergastic or essentially pure affect reactions, *par*ergastic or twist reactions, *dys*ergastic disorders from inadequate support or metabolism of the brain, *an*ergastic with defect by structural loss, and *olig*ergastic with deficiency through lack of development—without at once jumping to the conclusion that hereby we utter a diagnosis, and that not only of the facts observed, but of the whole patient and his final fate.

The table encourages lines of discrimination and *of emphasis, not of exclusion but of comprehension,* and each case, after the facts are in and reconstructed as the "experiment of nature" it is, is to be given the benefit of consideration of the five main issues:

1. General behavior, mood and activity.
2. Content and form problems.
3. Type and depth of the content and behavior disorders.
4. Course.
5. Causal factors and nature of process.

Only after the facts of complaint, story and examination are considered from all these five angles, together with the account of the personality and its positive and negative assets, only then should the student consider himself in a position to formulate the "experiment of nature" and the lines he would want to consider so as to attack, adjust, and regulate the problem.

Let us then go over the outline or memorandum.

I urge (1) consideration of *general behavior, mood and activity*—the kind of fact the student finds on our nurse's behavior chart—which makes one sense certain worthwhile points of importance, composure, overactivity, or underactivity, with *rapport* or lack of rapport. The facts here covered are almost sufficient to single out (without necessarily any need of concern about the content, largely on ground of general behavior, mood and activity) any *thym*ergastic or simple affect disorder with its excessive ease, aggression, elation or anger, or with inhibition, suicidal and nursing problems, sadness or anxiety; in contrast to other *more complex affects* of the fear, suspicion or hate type, and tension, panics, or compulsions, oddities, mannerisms and impulses, indifference, or defects. This topic coincides with the first two topics of the usual mental status, the behavior and appearance and the flow of activities and utterances.

Under *the content and form problems* we recall a provisional and relative contrast of merergastic or part-disorders as opposed to holergastic or sweeping disorders. I keep this contrast in a subordinated position so as to avoid too classificatory a separation between the minor and major psychoses. Among the merergastic or part-involvements I draw the attention to the hypermnesic hypochondriacal and obsessive, as opposed to the dissociative-dysmnesic hysterical disorders and processes, besides the more ordinary, mainly emotionally unstable and anxious and neurasthenoid types.

Among the more sweeping or holergastic involvements, I consider first the thymergastic or "pure affect" reactions already mentioned in connection with the general behavior and mood pattern, with a definite type of thinking disorder and with the exaggerated self-feeling, flight, distractibility and subjective *power,* or the depressive self-absorption, slowing, preoccupation and depressive topics—but both with more or less characteristic thinking difficulty; then the less pure and unequivocal "perplexed" states, the catathymic set complex-determined

reactions apt to be allied to the thymergastic ones; then come the topical systematized reactions, delusional or hallucinatory or both, and then the plainly parergastic incongruous, fantastic or passivity-like projections with scattering or strained tension. Where there is disorder of orientation, memory and judgment, we consider specifically, as conditions due to disorder of *support* of the brain, the delirious-dysergastic disturbances (with disorientation, hallucinations, dream situations and fears), and where we find actual *defect* traits, the anergastic loss of memory and judgment, at times with fits and contractures and palsies or coma or other neurologic evidences, to be scrutinized as to whether they are organic-*structural*, or organic-functional (i. e., functional but referable to a purely physiologically operating mechanism), or functional-mental, i. e., governed essentially by memories or lack thereof or by anticipations, or other (symbolizing) personality activity. For each of these terms I urge the student to state the actual pertinent events or activities or reactions seen in the case, and not any hasty identification of the patient with a one-word diagnosis or even description with technical terms. Indeed I delight in showing the student how inevitably normal and abnormal reactions are present side by side and also reactions belonging to different reaction-sets, which I do not want to see ignored or unintelligently broken up into fragment-like symptoms. Each reaction-set raises its own specific considerations and questions; and if more than one set is in evidence, there is no need of suppressing the facts or lines of natural interest. In the face of it all, even with all the teaching to the contrary, old habits will occasionally lead a pupil of the older school to ask: Shall I write it up as a dementia praecox?

We next pass to the *type and depth of content* and its disorders, considered for the type of *relation to the actual situation*, or the tendency to auto- or somato- and allo-psychic elaborations, and for substitutions and distortions, with attention to any suppressions and dissociations and compensations or regressions—a topic requiring fuller elaboration.

The tendencies shown in the *course* of the developments are contrasted as episodic, phasic, fluctuating, or progressive (acute, subacute or chronic), with or without fixation, or changeable, stationary or progressive or adjusting, or dementing; and finally we check up the *causal factors* and *the nature of the process*, evaluating what is exogenic, somatogenic, neurogenic and psychogenic (traceable to experience) and constitutional (inherited or at least ingrained).

What I am interested in from this point on is what concrete picture the worker makes for himself of the "experiment of nature" and the opportunities of doing something towards an adjustment.

If I can turn the attention to the essential specific facts of the case instead of a classification, with as much elimination of technical terms as possible, I feel we have rendered a service to patient and student alike.

THE FACTS VIEWED IN TERMS OF THE "COMPLAINT"

What we ought to be able to obtain in the course, if possible, is a formulation of the facts of the case by each student and then a discussion in reasonably small groups of students, in which all the pertinent questions could be raised and discussed in terms of curiosity about the *facts in the case*, and not merely some expansion of definition of a diagnostic term and conjectures leading from generalities to generalities. We have to cultivate all the natural curiosity and yet an order and insistence on treating "the experiment of nature" as "adequately formulated" or as "presenting gaps and uncertainties." And this is why I like to keep in evidence the question of the *complaints*, of the family, of the patient, those who are acutely involved and not inclined to be satisfied with a mere routine. On the other hand, I want to keep up the incentives that come from one's having to give a mature formulation of the facts to a possible consultant and to the family physician and to the research laboratories and, in case of death, to the autopsy physician. And before one lays aside the case, the facts offering material for statistical scrutiny have to be singled out.

In our case work we do not use blanks of prearranged items. The outline of examination and of the further procedure has to be in the physician's ingrained habit of work. I may give outlines of questionnaires for examinations to beginners, but it is the *topics* that count, and the questions and the course of the examination need many adaptations after one once has learned what must be covered.

The actual formulation of the facts does not constitute a bald diagnosis, but our statistical sheet or *front sheet* gives the data in the most concise form that will do justice to the facts, with a diagnostic term where the reaction-sets present deserve such a unification and identification.

In the end our task is the amplification and specification of the *complaint expressed in the most factual, objective and potent terms.*

PRECAUTIONS NEEDED

The *great danger* of abandoning the cut-and-dried nosological program lies in the *looseness* that is apt to ensue unless one makes it practicable to keep before oneself the essentials with which psychiatric experience has to work. This is why I resort to the expedient of giving the student the very concise indication of a perspective. The average worker will not be able to carry in his mind even the reaction-sets most commonly used, unless they are constantly before him in a most concise form. The students have at their disposal in the library the as yet un-

published discussions of the current reaction-sets and records of pertinent cases, similar to the old Notes of Clinics, so that there is no need of dependence on mere abstractions.

But the material is extensive; the time and energy of the student limited and the need of systematic help great; hence the sheet of reminders—not a sheet of classifications. The facts are given as they are naturally lumped together and not offered as mere detached symptoms.

Unsystematized information is useless, and the question arises whether it is not necessary to take the students very much further into detailed studies à la Freud and others, to give them some of the supposed thrills of present-day front-line work. I personally prefer to remain on the ground of those facts with which I am likely to be forced to work. I consider it a justified indulgence of my own scientific curiosity and desire for therapeutic specialistic efforts to penetrate into all kinds of promising details; but for teaching and ordinary practice I prefer the best use of the foot rule, and the use of the instrument of precision only where the setting is clear.

To what extent is it possible to keep up in the student the interest and confidence in so extending and adjusting the complaint of the patient and the problem presented through the history, the data of examination, that a practically useful pattern of fact and possibility of action shapes itself? A picture of the "experiment of nature," using as much as possible the facts of the case, without one's drawing too much on the mere analogy to other cases by a mere process of identification with similar cases? Or without one's bowing too credulously to the importance of recondite detail in the personal fancies, the unconscious, etc.?

I contend that every case is interesting if we allow the facts to appear in their natural connections, and that not only from a remote nosological angle or from too microscopic a psychopathologic or other specialistic angle.

RELATION TO "PATHOLOGY"

Our faith in such a procedure depends on the type of principles of pathology we work with. If we are imbued with the idea that there necessarily must be something inherently wrong in taking the facts *as* we find them or at least *can* find them at *work,* and that we must at once speak of some manoeuvres of a reality-shy "unconscious" or some hypothetical lesion or chemical findings, in order to give them respectability, we may consider the working with the facts of the case futile. If, on the other hand, we accustom ourselves to state the case in terms of the facts at hand, taking care to state it completely and practically in the different versions needed to give the facts so as to answer the natural questions of the consultant, of the family physician, the family, the nurses, and especially the patient, we shall much more definitely keep on a ground of actualities representing the facts rather than on the ground of a hypothetical tune or incantation habitually sung to satisfy appearances of diagnostic and prognostic skill or of any special brand of psychodynamic detail.

You might say: where would we be on that basis with typhoid fever, with diabetes, with brain tumor, with conditions in which the persons involved cannot possibly face the facts with any degree of profit? There is no doubt that progress is due to research calling for much detail work, much of which went devious ways. Some of the present-day psychologizing no doubt is of a loose and devious character. But can it not be used badly? How can we prevent the average person from assuming that if the facts are of a type which one is in the habit of using only in terms of "will-power" and good-will and good intentions, the case should always be handled according to such naïve reasoning? It simply has to become a habit and an obligation to draw into evidence those facts which count; they gradually become absorbed in the thought of the physician and the laity, who to-day have accepted the typhoid diagnosis, the complement fixation, etc., without knowing very much of the technical detail. It is true that the public tends to pin the attention too exclusively and one-sidedly on the theories of the osteopath, the newspaper explanation of pressure on the brain and the nerves, and brain surgery, and the exclusive incrimination of poisons coming from teeth, and overspecialized brands of psychopathology, or the one or other tendency that catches the public fancy; but it is just here that the habit of speaking in terms of the facts at hand will do more than just taking shelter under over-ambitious or mystifying talk of something in the mind of a preoccupied slave of a few set ideas or terms. There are bound to be some clear heads who will teach us how to call a spade a spade and to cultivate teachable topics and teachable formulations of actual experience and procedure in sufficiently direct and simple terms—who will be able to talk in terms of mood or affect and content and the type of its distortion, the course and causes, without having to give up speaking in terms of the facts at hand.

VAGARIES OF NOSOLOGY

As a warning example of what a largely nosological approach operating with too detached symptoms and too ultimate conclusions is apt to do to psychiatry, I like to show the student the laudably honest display of the annual statistics Kraepelin himself publishes in his textbook (vol. I, p. 5, of the 8th edition) and in comparison the statistics based on the consideration of the personality as well as the reaction-type, taken from Dr. Farrar's article in the *American Journal* of *Insanity,* 1905-1906, Vol. 62, p. 276.

It is quite interesting to compare with these the corresponding statistics of a more nosolog-

ically inclined group (id., p. 280). It should not be hard to recognize that a habit of relating the observations to what one learns from an inborn way of critical evaluation of normal life and its minor and major maladjustments and malreactions, is as important as one's use of the classical nosologic complete types. But neither the one way nor the other should be depended on exclusively.

The training of the medical student can only be a course of orientation.

It will have to be the basis of all that which the student carries into life, perhaps all he ever sees of organized psychiatric work, but certainly something that he will meet again in whatever branch of medicine he takes up; or it may be the incentive to further work in the field, be it towards practice or research. In either case I want to implant a sense for sets of facts with a genetic-dynamic meaning.

We should make a mistake if we kept too far away from what the student is apt to pick up in his reading.

I remain reasonably close to the nosologically formulated statements like those of the various renderings of Kraepelinian concepts, and on the other hand, those of the frankly psychodynamic schools, so that the student does not get a feeling of bewilderment and of just another special brand of doctrine.

There are certain fundamentals accepted by all.

THE USE OF LIFE EXPERIENCE AS WELL AS OF PATHOLOGY AND NOSOLOGY

As far as possible, I do, however, lead the student to cultivate a sense of the extent to which his or her life experience and sense of familiarity and probability about human facts harmonize with what is found in our psychiatric experience. At the same time I urge that the essentially common-sense starting point and ultimate formulations must be systematically checked up by orderly comparison with the organized technical experience.

The task of teaching or of formulating the material one works with is particularly difficult in psychiatry. Everybody knows something about life-problems and their successes and failures. It is human that one should know. Yet the field is naturally large and complex and the attitude assumed often supercilious. When you then ask those who "know it all" and feel there is nothing to learn, they will assure you that really they do not know anything about it and they imply that nobody else knows. This is, of course, merely a declaration of irresponsibility. It is quite true that we have to allow the decisions of psychiatry to remain subject to the final verdict of juries and lay judges; we depend on the balance of judgment of the families and the patients for the extent to which our formulations are used. And there are almost as many denominational splits among us as among those who live on preaching the gospel of love and peace and salvation. Hence my desire to keep as close as possible to such facts as can be kept under test.

WHY SHOULD WE AIM AT A CONSENSUS

What we aim at is this: order commensurate with what is needed—what we are actually working with; simplicity wherever possible, certainly preferable to sham perfection; a habit of dealing scrupulously and critically first with what is *at hand* and within reach and fit for formulation for one's work with the patient, and a sense of obligation to test one's vision and action in the light of the organized experiences of one's sciences. Our goal has to be a reasonable consensus and within it a sense of responsibility for a reasonably supervised training before one assumes either guidance of general opinion or responsibility with patients. I want to mention just a few noteworthy items illustrative of the present-day situation and the need of more than untrained good intentions.

A few years ago a man keenly interested in the progress of medicine and medical teaching told me of a kind of conversion on his part to the importance of mental hygiene and the mental and social factors in medicine. He wanted to reform psychiatry and medicine together by having every patient studied from the psychiatric end and by abolishing the need of a special psychiatric clinic or hospital by work at the source. Considering his genuine interest in pathology, I thought he might see the advantage of an adjustment in the teaching of pathology as it is taught today, with the microscope as the principal means of extending the student's horizon. Fate would have it that not long afterwards a close friend of this man brought a member of his family to me with the request to pay personal attention to the presence of an anxiety neurosis which, without any doubt in his mind, was the center of the whole trouble. My first interview revealed the fact that the whole story of the complaint pointed to a plain and unmistakable somatic disorder, that the patient's discomforts had all been viewed from the angle of Pollyanna, which then caused panics and feelings that the trouble was being misunderstood. And it became clear that the only possible way of getting control of the case had been most tragically swamped in a flood of misapplied so-called mental hygiene.

A conscientious regard for the complaint of the patient and making the medical task one of formulating *all* the facts of the complaint and the results of examination would have saved the patient. A psychiatric diagnosis is more than a consideration of a few mental symptoms and also more than a few other points that happen to be in the public or medical eye.

The counterpart to this are the cases of evisceration which come to us with a history of all kinds of complaint visited on innocent but

mismanaged organs, a cocksure diagnosis that there is what slang calls "enough pathology" to explain all the trouble and to excuse a virile, aggressive eradication of the incriminated organs. It evidently is not easy to get a safe balance and dependable bearings without a much more widely acceptable knowledge of some plain facts of the genetic-dynamic understanding of human life and personality. The assertions of simplicity and plausibility in this field and the confidence of the untrained are usually quite out of proportion to the practical evidence as shown by results.

Note this example: The discussions of psychic factors in general disease led the editorial writer of the *Journal of the American Medical Association* to state:

"This review of the possibilities of psychic disorders in general disease demonstrates the truth of Woodyatt's assertion that 'the power of emotions to produce physical aberrations of the body does not seem unreal.' Recognition and treatment of visceral and somatic symptoms which spring from mental causes, therefore fall well within the field of the general practitioner and of the internist."

To this we should add: Yes, these disorders are common enough to make it a responsibility of any physician to learn something about the mental causes and their working. It is not likely that the general practitioner and the internist will be able to do their best without such knowledge. It will have to be acquired by a study of these events when and where they occur, with attention to the situation and to the facts that make the reaction excessive.

CONCLUSIONS

I therefore adhere to a practical procedure as follows:

With my students and co-workers I cultivate much more conscientiously than ever "the complaint" as offered by the patient and the lay observers and family and the family physician that are "put to it," and confronted with more or less real situations and most apt to be critical and inquiring; and I include in "the complaint" the facts one determines with one's own growing experience in the taking of the history of the present illness, its setting and antecedents, the early history and the family history and the personality make-up and assets. This keeps the problems of the case close to the facts which I allow to stare me stubbornly and provokingly in the face; it tends to keep before us the therapeutic problem of the patient and nurses and the physician in charge, the short-term and long-term problems of management, and the assets as well as the actual difficulties, the course, and the probabilities of outcome and the formulation for the family and the patient and the best technical statement.

The result is most apt to be one of consideration of the facts in groups with genetic-dynamic meaning, at the same time a sound general and special pathology and formulation, beneficial to the advancement of medicine, i. e., of what European medicine designates as "pathology and therapy," and the sanest formulation of settings for any experimental inquiries, for the so-called prognosis and diagnosis, and the understanding and final grouping of the facts with which one deals.

The procedure requires a formal checking up of facts and their bearings and ultimately also a sounder terminology for groups of facts which retain their meaning and connections without being prematurely split up and which can be subjected to statistical study without having undergone irresponsible disruption.

The result will as far as possible be in terms which do not inveigle us into excessive confidence that oracular pronouncements are handed down and that attention to the plain facts of the case might become superfluous.

There results from all this a kind of philosophy for the physician and for medicine.

Our present generation is learning fast a big lesson from biology and from medicine and—as far as that goes—from all life as it is: We see ourselves as organisms that rise and bloom and pass and do their best under the ideal of ultimately making themselves in a way unnecessary through their own achievements—with various types of satisfactions as one goes along in one's fancy-endowed life. We do not so much aspire to eternity, but to leave when we pass the best opportunity for new times and new life. So it is with medicine. The goal of medicine is peculiarly the goal of making itself unnecessary; of influencing life so that what is medicine to-day will become mere common sense to-morrow or at least with the next generation. The efforts of the worker of to-day become so assimilated in the common sense of to-morrow that it must be our pride to see that it has past into the real objective nature of the world about us, no longer burdening our attention, but allowing us or those after us to do the same for ever new problems, with ever new achievements and satisfactions.

It is in this sense and for this purpose that I advocate the genetic-dynamic formulation of the concrete facts of each case, and not only a nosological psychiatry.

VERMONT STATE MEDICAL SOCIETY

X-RAY IN TREATMENT OF CERTAIN DISEASES*

BY L. B. MORRISON, M.D.†

As suffering and sacrifice always have been the vale through which any great pioneering effort has passed in reaching its goal: so has it been true in the development of treatment by the x-ray. It was the suffering of those early pioneer workers, caused by the effect of the x-ray upon normal tissues, which first suggested its use in the treatment of diseased tissues. Early operators did not realize the dangerous character of the rays; and, consequently, ignorance claimed its usual toll from among them and their patients. By earnest study, research and investigation, the use of the properties of x-ray and its effect on living tissue have been determined. Snook, gave us the self rectifying transformer: Coolidge, gave us the tube. Soon out of a rather chaotic situation there developed instruments of precision. With filtration of the ray, correct dosage became an established fact. Through the painstaking methods of such men as Albers-Schonberg, Haenisch, Bordier, Beclere, Dodd, Pfahler and many others, this work has steadily progressed.

Only 32 years have elapsed since Conrad Roentgen gave the ray to the world, suggesting that it might be useful in the diagnosis and location of fractures and foreign bodies. Now it is being used by industry, art, and every branch of medicine and surgery, for both diagnosis and treatment.

That you may understand more clearly the basis of treatment, I will describe briefly some of the characteristics of x-ray. X-ray consists of soft and hard rays of invisible light having different wave lengths. The soft ray has a long wave length, and causes a greater skin reaction than the hard ray with its short wave length; provided that the time of exposure and milliampere minutes are the same. Then too, different cells of the body react differently to the ray. From this fact comes the Law of Bergonie and Triboudeau: "Immature cells and cells in an active state of division are more sensitive to the X-Ray than are cells that have already acquired their adult morphologic, and physiologic characteristics." This law is perhaps not entirely true. Different rays give quite different effects upon one and the same variety of cells. Delayed reaction in some patients, while active in others. Consequently careful distinction should be made between the different actions which different rays have on the same variety of cells; the selective action which the same kind of radiation has on many different varieties of cells, and the resistant action of epithelium which has been the basis of treatment. Until lately the erythema dose has been the guide of estimating the dosage for other tissues. All highly specialized cells in glands such as ovaries, testicles, thyroid, thymus and lymph glands are very susceptible to the ray, while muscle and fibrous tissues are less susceptible. However, any tissue in active cell division reacts easily to radiation. Today our biologists and physiological chemists are studying cells, their reactions, the changes in the intercellular substances and blood, due to the action of the ray. Physicists are developing the best type of ray to use and an exact method of measurement by means of the ionization chamber. This gives us great hope for the future advancement of Roentgen therapeutics.

While treating malignant diseases of the breast, observation was made by myself and many others that in a few cases, suffering from asthma, chronic bronchitis and chronic bronchitis with slight bronchiectasis, the patient would return after several treatments reporting that the treatment had relieved the asthma, cough and expectoration. Dr. Leonard, and his co-workers found that the secondary paroxysmal stage of whooping cough was relieved or nearly prevented in many cases by the administration of small doses of x-ray at low voltage, through the chest and mediastinum. A recent writer reports relief and cures of asthma and the paroxysmal stage of whooping cough by x-ray given through the epigastrium antero-posteriorly and postero-anteriorly. Various theories are advanced as to relief. Hajos' theory in relation to the diminution of the spasm in asthma or whooping cough, is that the treatment by the ray causes a desensitization of the vagus nerve endings. In my experience radiotherapy has no place in the prophylaxis or early stage of whooping cough, but I believe it is valuable in the second paroxysmal stage. Amelioration of symptoms is noted after the first treatment and is more marked after the second and third which relieves the laryngeal spasms. A patient, suffering from frequent spasms day and night, has only two or three spasms, much less severe after treatment. I believe the best results are seen where the infection is severe: combined with tracheo-bronchial and mediastinal gland enlargement or thymic enlargement. Under treatment the glands shrink and probably there is a vaccination, due to the destruction of the leukocytic barriers, thereby releasing immunizing agents into the system. An enlarged gland by pressure on a bronchus may initiate the spasm, therefore by

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†For record and address of author see "This Week's Issue," page 389.

shrinking these glands, the prime factor is removed. This latter may be the reason why we are able to stop a chronic cough in so many children. Often a Roentgenogram of children's chests show many tracheo-bronchial glands, the same is true in adult cases of chronic bronchitis. Klewitz, says of asthma that the best cases for treatment are the true cases with clinical proof: that is by sensitization to a definite protein. Patients with marked emphysema in whom the Roentgenogram shows a low, flat diaphragm with very little or no movement, get but little relief. The final stages of an acute cold, especially where the patient has a persistent cough, can be terminated rapidly in many instances by one treatment of the x-ray through the mediastinum.

Roentgen therapy is being successfully used in treatment of low grade infections and is a recognized assistant in the treatment of tubercular adenitis. When the glands undergo caseation necrosis, simple aspiration, followed by Roentgen treatment aided by proper hygenic measures should be all that is necessary for cure.

Furunculosis and carbuncles respond well to x-ray treatment, if applied early. Pain is relieved after a few hours and the swelling subsides. Systemic toxemia is relieved in from six to eight hours. In cases where there has been delay of two or three days, the treatment relieves pain and causes a more rapid necrosis together with the relief of the systemic toxemia. X-ray treatment is of special value in furunculosis of the nose, lip or cheek. Usually one treatment is sufficient.

Recently Roentgen therapy has been used very successfully in the treatment of erysipelas. It increases the local resistance to the causing factor. Dr. E. S. Plateou and Dr. Leo Rigler, in a recent article, say "there is a rapid improvement in both the systemic and local manifestation with the reduction of temperature to normal in from one to two days, a single treatment being used in most cases." They present summaries of eighteen cases in which the patients were treated with a solution of magnesium sulphate, glycerine packs and the usual routine, along with the accounts of twenty-three cases treated by Roentgen-Ray, the method they favor. I have not had sufficient experience to definitely state results. As the dose given is well below the erythema, there is no danger from the treatment of all these just mentioned diseases. For, with the exception of chronic asthma, there is rarely any reaction more than a very occasional nausea.

In keloids I believe that the x-ray is the most satisfactory method of treatment, though requiring much time and patience. The skin tends to return to the normal, leaving the pliable, symptomless scar. Radiation is especially valuable after the surgical removal of large keloids, which have a tendency to recur. If the ray is applied within two or three weeks following the operation, the scar can be kept soft and pliable. X-ray is extremely valuable in removing keloids of the arms, shoulders, neck and on the face; also in removing large keloids caused by burns where much skin surface has been involved.

Warts on the feet are especially susceptible to x-ray treatment. If recent and not too deep, they disappear with one treatment. Those on the hands are better treated by electro-surgery as are those around the nails.

Acne is cured many times permanently and is usually relieved by a few treatments of x-ray. The dosage is mild; and frequently improvement is noted after the second or third treatment. If, after four or five treatments, the case is stubborn and shows no change there should be a resting period. One should never come near the erythema dose. In the treatment of inflamed skin one should always remember that the dosage sufficient to cause an erythema is less than the dosage causing erythema in normal tissue.

Roentgen therapy in the chronic myelogenous leukemia at the present time is most satisfactory. The number of working days are increased and the suffering greatly decreased. Cell destruction in leukemia is correlated with the direct action of the ray. The leukemic white cells being of low resistance and just a few treatments are required usually to cause the white cell count to drop to 12 to 15 thousand and remain fairly stationary with an occasional treatment. There are no cures and these patients should all be under careful medical supervision.

Roentgen therapy is the logical treatment for Hodgkin's disease.

From my experience in treating several hundred cases of uterine myomata and fibromata, I have a firm conviction that x-ray treatment has a definite place in the armamentarium of the surgeon and gynecologist for the treatment of non-inflammatory uterine conditions and benign tumors of the uterus.

TREATMENT IS INDICATED

1. In the myoma and fibroma, especially in cases past 40 years of age, except in the multiple pedunculated and submucous type or those suggesting actual degeneration.
2. In functional menorrhagia and metrorrhagia with no evidence of gross pathology in a patient nearing the menopause.
3. In certain type of menorrhagia and metrorrhagia in patients under 40.

Contra-indications to irradiation:

1. The large tumors causing pressure or pain.
2. Tumors complicated by ovarian or tubal disease, either inflammatory or malignant.
3. Tumors of rapid growth, submucous tumors.
4. Necrotic tumors as indicated by a cachexia out of proportion to the blood cells.

Any of the above cases should always be treated under the supervision of the physician or gynecologist. Results in many cases begin

after the third treatment, occasionally after the first. The myoma shrinks and usually disappears. In cases showing no improvement, a wrong diagnosis must be suspected and surgery can be used with no actual hazard. In some of the larger tumors the metrorrhagia can be stopped, the patient treated for the anemia, and later operated upon. Thus a dangerous risk is changed to a safe one, also the patients suffering from myocardial changes, tuberculosis or other diseases that contra-indicate surgery can be much benefited and many times cured. There are no fatalities. Patients suffer no ill effects from the treatment; except a few have Roentgen sickness. They seem to have a shorter menopause with few symptoms, hot flashes predominate. In those cases of menorrhagia and metrorrhagia without organic change in the uterus, treated in the third to the fourth decade, a lighter dose is used and the patient tends to return to normal. The ovarian function is established and normal pregnancy has been known to follow. In the severe metrorrhagia of the young, Radiation of the spleen is helpful in some cases. More recently, mild dosage is being used over the ovaries to stimulate their function in patients who have never been pregnant and are suffering from amenorrhea. All such cases having been carefully studied and organic lesions ruled out. Several writers report results.

Concerning malignancy, Dr. Barclay, says that the problem of malignancy as seen by the Radiologist is full of contradictions. Dr. Greenough[1], in a recent paper, says: "Cancer is not a single disease, but many diseases; differing not only in location but in rapidity of growth and of dissemination as well. There are a certain number of cases which are so malignant and so rapid in their development that our present methods are insufficient to cope with them." This taken with the fact of delayed diagnosis or an elapse of time before obtaining adequate treatment brings to the Radiologist direlects among whom he must try to salvage as many as possible. When we know that a cancer, which has gone untreated for a period of months, has in the majority of cases metastasized to some other portion of the body, although only localized evidence of the disease is noted, we realize the problem of the Radiologist.

Sir Berkeley Moynihan states: "Statistics can be made to tell anything, even the truth." When one undertakes to give cancer statistics as to cure, it resembles an equilateral triangle, in which the base resembles the number of cases treated, time the other two sides of the triangle, the percentage of cures coming to Zero at the apex. That is, one per cent. of the patients die in one per cent. of the total number of years.

Many cases that have been diagnosed as cancer and have been operated upon with a pathological report of cancer, have died of some other intercurrent disease or perhaps still live many years. A wrong diagnosis is the conclusion. It would seem that with proper co-öperation of the patient, family doctor, specialist and pathologist, an earlier diagnosis could be established. The first duty rests with the patient. As truly as patients need to visit the dentist for examination of their teeth, so it is necessary to them to demand from their physician a periodic examination with a direct examination of those regions habitually invaded by cancer. I feel sure many more early diagnoses could be revealed if such examinations could be arranged.

The pathologist in his careful manner has classified the types of malignancy, grouping them in the main according to the activity of the cellular elements. Surgery is undoubtedly the method par excellence in the treatment of malignancy today. However, the Roentgen-therapist stands shoulder to shoulder to follow up the surgeon and is second only to surgery. Dr. Greenough[2] says: "There are only two methods of treatment for cancer of the breast which hold the confidence of the medical world, surgery and radiation, and it is universally admitted that treatment by radical surgical operation is the only method which can be relied upon to cure the disease. Cures by irradiation, without surgery, are not to be expected, although irradiation treatment may be combined with surgery, and in almost every case is of the greatest value in palliative treatment."

The question arises as to whether radiation should be preoperative, postoperative or employed wholly in the treatment of the inoperable cases. There is definite evidence in the latter instances that cases live at least one and a half years longer following Roentgentherapy and are much more comfortable. It is my belief that preoperative radiation, if properly used, would increase the chances of surgical cure. Also, postoperative irradiation, not sufficient to damage the tissue, is justifiable. Many cases that are submitted to surgery would live longer and more happily had simply Roentgen therapy been used.

Carcinoma of the uterus is best amenable to surgery; while carcinoma of the cervix, if at all advanced, is more amenable to Radium and Roentgen therapy. In seemingly localized malignancies, radical surgery and radical Roentgen therapy if used, must be used to destroy the growth. Failing to do so by the latter method in one of the first treatments will prevent its future use in treatment.

W. J. Mayo[3] says: "The difficulty in evaluating Radium and x-rays in the treatment of cancer lies in the fact that they are used so largely in treating cases of inoperable cancer or of metastatic cancer following operation, where the most that can be expected is palliation. The thoughtless give these agents little credit for what they actually accomplish, and often, disappointed that the impossible has not been accomplished, minimize their value."

We can do much in the palliation of cancer.

Persistent pain in the back or pelvis can nearly always be relieved by Roentgen therapy. Given a patient with a tumor in the breast, or breast removed coupled with a persistent pain in the back or with a non-productive cough, suspect metastases. X-ray examination may reveal no diagnostic changes at first an operation should not be allowed as later developments will show the metastases. I am thankful to say that we are getting fewer cases of cancer of the breast to ray for pain in the back or for a cough directly after operation.

Large, ulcerating areas can be healed, and life made livable with proper treatment. Skin metastases if localized should be removed surgically and always treated. I have a number of cases that have had skin metastases and who are living five or more years with normal skin, thanks to x-ray treatments alone.

Unfortunately the surgeon, the internist and the Roentgenologist have a tendency to over estimate his own method, not giving credence to the true value of methods offered by the other two departments. Let us hasten the day when we shall strive, not for the predominance of any one method, but to obtain the best possible result by whatever means or combination of means there are in order to give the patient the best results. The field is large and there is work for all.

In closing, just a word of caution to the would-be-user of Roentgen therapy. It has been truthfully said, "A little knowledge is a dangerous thing." This is especially true in Roentgen-therapy. A medical doctor, though possessing a knowledge of how to operate an x-ray machine or radium tube, is not competent to do Roentgen therapy without a thorough course of instruction.

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3 Radiology, 8:95, February, 1927.

MISCELLANY

VERMONT DEPARTMENT OF PUBLIC HEALTH REPORT FOR JULY, 1928

Communicable diseases have been reported as follows: Chickenpox, 47; diphtheria, 2; measles, 177; mumps, 33; poliomyelitis, 2; scarlet fever, 14; typhoid fever, 1; tuberculosis, 11; whooping cough, 126.

The Laboratory of Hygiene made the following examinations:

Examinations for diphtheria bacilli	81
" " Widal reaction of typhoid fever	31
" " Malarial parasites	0
" " Tubercle bacilli	250
" " Evidence of syphilis	320
" " Gonococci in pus	94
" of blood for contagious abortion in cattle	15
" " blood for white diarrhea of fowls	544
Examinations of water, chemical and bacteriological	190
" " Water, bacteriological	109
" " Milk, market	64
" " Milk, submitted for chemical only	1
" " Milk, submitted for microscopical only	2
" " Milk, submitted by Department of Agriculture for added water	3
" " Foods	16
" " Drugs	1
" for the courts, autopsies	7
" " the courts, miscellaneous	44
Autopsies to complete death returns	0
Examinations of animals' heads for evidence of rabies	1
Miscellaneous examinations	71
Total	1844

The Division of Communicable Diseases makes the following report:

Cases of gonorrhea reported	45
" " syphilis reported	54
" " gonorrhea reporting for treatment	8
" " syphilis reporting for treatment	15
" for intravenous treatment	15
Total treatments	86
Gonorrhea outfits distributed	97
Wassermann outfits distributed	308

The Division of Tuberculosis has distributed 10,000 copies of the *Modern Health Crusader* and has held exhibits in Addison, Burlington and Montpelier.

The Poliomyelitis After-care Division made 91 home visits, fitted 20 pieces of apparatus, altered 15 pieces of apparatus and made 34 orthopedic corrections to shoes. Four patients returned to their homes from the Fenway Hospital.

In the Maternity and Infancy Division, the nurse visited 12 towns, conducted seven clinics at which 207 children were examined.

PREVENTION OF BLINDNESS

The New York State Commission for the Blind, whose work heretofore was devoted almost exclusively to the blind, recently announced the opening of a "Prevention of Blindness Department," with headquarters in New York City. Co-öperating with the department will be a consulting committee of competent eye specialists including Dr. Conrad Berens, of New York City, Dr. H. Robertson Skeel of New York City, Dr. David F. Gillette, of Syracuse, New York, and Dr. William M. Mehl, of Buffalo, New York, a Member of the Commission; the National Society for the Prevention of Blindness; and various other health and educational groups.

"The American public is gradually coming to the realization that more can be accomplished by prevention than by cure," said Miss Sarah A. Clendinning, director of the department. "Because of the willingness of many people to ask for information and help on the proper treatment and care of eye difficulties when they first appear, it has been possible to save hundreds of eyes which might otherwise have become useless."

Years ago, people outside of the medical profession knew very little concerning the causes of

blindness. "Now, however," declared Miss Clendinning, "the public is being informed not only of the causes of blindness, but the means of counteracting them as well. It is our opinion that blindness in most cases could have been prevented.

"Much is being accomplished in the way of prevention of blindness by beginning at the bottom with the very little folks—the preschool children—and correcting their defects, and through sight-saving classes children with seriously defective vision who attend school. The records of the National Society for the Prevention of Blindness show that the eye hazards of industry still constitute one of the most serious causes of blindness, if not actually *the* most serious."

FEEBLE-MINDED AND EPILEPTICS IN STATE INSTITUTIONS: 1927

VERMONT

Preliminary Report

Washington, D. C., July 30, 1928.—The Department of Commerce makes the following announcement for the State of Vermont concerning results of the 1927 census of feeble-minded and epileptics in state institutions.

The Vermont State School for Feeble-minded Children had a total of 19 first admissions during the year 1927, as compared with 22 in 1926, and 55 in 1922.

These first admissions represent patients received during the year, who had not previously been under treatment in any institution for feeble-minded and epileptics. Such newly admitted patients afford the best available measure of the number of new cases which are brought under institutional care during the year.

The first admissions in Vermont in 1927 numbered 5.4 per 100,000 of population, as compared with 6.2 per 100,000 for 1926, and 15.6 for 1922.

The extent to which provision has been made for the state institutional care of feeble-minded and epileptics is perhaps best indicated by the number of patients in the institutions on a given date. The number of patients present in the Vermont State School on January 1, 1928, was 235 as compared with 126 on January 1, 1922; and the ratio of such patients per 100,000 of general population increased from 35.8 on January 1, 1922, to 66.7 on January 1, 1928.

Of the first admissions in Vermont during the year 1927, 6 were males, and 13 were females; and of the patients present on January 1, 1928, 85 were males, and 150 were females.

These figures are based on reports furnished by the institution, with the co-öperation of the State Department of Public Welfare. The figures for 1927 and 1928 are preliminary and subject to correction.

Year	First Admissions during the year		Patients present January 1	
	Number	Per 100,000 of general population*	Number	Per 100,000 of general population#
1928 ...	...	...	235	66.7
1927 ...	19	5.4	234	66.4
1926 ...	22	6.2	236	67.0
1923 ...	...	...	179	50.8
1922 ...	55	15.6	126	35.8
1910 ...	(**)	(**)	(**)	(**)

* Based on estimated population July 1.
\# Based on estimated population January 1.
** No state institution in operation.

MEDICAL PROGRESS

PROGRESS IN NEUROLOGY

BY ABRAHAM MYERSON, M.D.*

FOR many years the question of "traumatic neurosis" has agitated certain medical and legal groups, more especially those concerned with war disabilities and with the problem of compensation for industrial accidents. There have been some who have stoutly maintained that the traumatic neurosis ought not to be compensated; others, that an early settlement is necessary, implying that litigation and a desire for financial gain play leading rôles in the etiology of that condition.

Whatever may be true in those cases in which the injury does not involve the head (and even in such cases the reviewer wishes to indicate that he does not believe that the above is a correct view of the situation), a totally different picture is gradually developing in the case of brain injury, and it is becoming apparent that the term "neurosis" is not warranted as applied to the headache, dizziness, changed temperament and mood, and general energy loss so common after a severe blow to the head. For some years, German investigators, notably W. Wartenberg (see Zeitsch f. d. ges. *Neur. u. Psych.* 1924, 94 and especially *Arch. f. Psych.* 1926, 507) have been making x-ray studies of the brain in individuals who present no neurological signs and are declared to be physically negative despite the fact that they complain bitterly of those symptoms which chronically persist after acute injury to the brain. By air injection by the lumbar and ventricular routes, it is discovered that there are dilatations and distortions of the ventricles, adhesions in the subarachnoid space in some places and dilatation in others, showing that there is atrophy and distortion of the brain substance, etc. Wartenberg concludes that in many instances the traumatic neurosis is in reality a traumatic encephalitis, and that the brain does not really recover even when pathologic neurologic signs are absent. This seems entirely reasonable to the reviewer, who believes that in many cases when we say "physically negative", we should keep in mind that what we mean is negative to our present and limited methods of physical examination.

Wilder Penfield has further confirmed this view by his report of the effects of air injections by the lumbar route in the cases of head injury with chronic headache and dizziness. He withdraws 5 cc. of fluid and injects 5 cc. of air. He repeats this alternate fluid withdrawal and air injection until from 50 to 100 cc. of fluid is removed and air injected. He reports very decided improvement in some of his cases which had been chronic for some time and in which compensation failed to cure the symptoms. (*Surg. Gynec. Obst.*, Dec. 1927.)

Osnato and Giliberti (*Arch. Neur. & Psych.*, Aug., 1927) vigorously attack the term concussion and conclude:

Their material consisted of 100 cases of concussion of the brain, with or without fracture of the skull. In sixty-eight there was a wound in the scalp existing either alone or associated with fracture; in thirteen cases it was associated with fracture of the skull at the base, and in thirty-six cases with fracture of the vault, leaving nineteen cases in which the only evidence of injury was the wound in the scalp and thirty-two cases in which not even a wound in the scalp was present. In fifty-three of the 100 cases there were injuries in parts of the body other than the skull. Ninety-six of the patients were men, two were children, and two were women.

"Anatomic and clinical investigations seem to show definitely that our conception of concussion of the brain must be modified. It is no longer possible to say that "concussion is an essentially transient state which does not comprise any evidence of structural cerebral injury. Not only is there actual cerebral injury in cases of concussion but in a few instances complete resolution does not occur, and there is a strong likelihood that secondary degenerative changes develop. When this happens, we have a condition which, clinically at least, resembles some of the reactions seen in encephalitis. We feel, therefore, that the postconcussion neurosis should properly be called cases of traumatic encephalitis."

In the discussion of their paper, Ernest Sachs further attacked the concussion idea, stressed edema of the brain as a factor in the acute symptoms, and pointed out that prolonged headache is frequently due to an escape of spinal fluid in the subdural space where it remains indefinitely unabsorbed and acts as a source of pressure.

The importance of head injury as a background for spastic paralysis, epilepsy and feeblemindedness is again emphasized by P. Schwartz (*Ergebn. d. inn. Med. u. Kinderh.*, 1927, Vol. 31), who has for years studied the brains of newly-born children and who, with his pupils, has carried on experiments with new-born animals. Like all those who pass from generalities to specific studies, he tends to minimize the vague hereditary predisposition which medicine so often uses to cloak its ignorance.

*For record and address of author see "This Week's Issue," page 389.

NEUROGLIA

For some time, neuropathology had apparently been in a state of decline and the pessimistic predictions have been freely made, especially by the so-called functional school of neuropsychiatrists, that its limits of usefulness were reached. The brilliant work of the Spanish school of neurologists, y Cahal, Del Rio-Hortega and Achucarro, which has been brought to the English-speaking world by Penfield and Bailey, has brought entirely new methods of attack on the problems of the pathology of the central nervous system with resulting new concepts as to the processes going on in the nervous system. The reader who wishes details of this work, which is very technical and need not be gone into in a review for the general medical public, is referred to the English articles of Bailey (*Journ. Nerv. & Ment. Dis.* April, 1924) and Penfield (*Arch. Neurol. & Psychiat.* Aug., 1926).

Rio-Hortega has shown that in addition to the nerve cell and the neuroglia, derived from the epiblast, there is a type of cell, the microglia, a migratory cell of definite morphology. In the last year F. Jiminez de Asua (*Ztschr. f. d. ges. Neurol. u. Psychiat.*, Vol. 109, 1927) has further studied the microglia. He points out that these cells belong to the great group of cells of mesodermal origin which throughout the body are phagocytes and in the nervous system split hemoglobin and store iron as well.

CEREBRAL HEMORRHAGE

A new point of view in regard to cerebral hemorrhage is that it is the last phase of a definite chain of events of neuropathological importance. (J. H. Globus and I. Strauss—*Arch. Neurol. & Psychiat.*, Aug., 1927). They conclude:

"Anatomic and clinical observations are here assembled in support of the belief that spontaneous massive cerebral hemorrhage is a terminal phase in a sequence of events, which have their beginning in a generalized or somewhat localized disease of the cerebral vessels, and which results in the closure of one or more of such vessels in a given, circumscribed area. This leads to the creation of an ischemic zone and a consequent focal encephalomalacia. With the production of such cerebral softening, an area of diminished resistance is created which is an important if not a determining factor in the causation of cerebral apoplexy. In the presence of a diseased blood vessel and increased vascular tension, a reduction in the consistency of the surrounding tissue of the brain is an essential precursor to the rupture of the vessel wall and the unhindered escape of blood.

"The anatomic manifestations in support of this view are: (1) The presence of generalized vessel disease. (2) The diffuse productive changes throughout such brains. (3) The well defined organization in the wall limiting a hemorrhagic cavity. (4) The presence of exposed blood vessels in the hemorrhagic cavity. (5) The frequent occurrence of miliary aneurysms in the group of cases studied."

A somewhat different point of view, but leading in the same general directions, is that of K. Neubürger (*Zentralb. f. d. ges. Neur. u. Psychiat.*, Nov. 1927). He believes that before cerebral hemorrhage takes place, there is first an ischaemia which is due to a cerebral vasomotor disturbance, and that in the genesis of apoplexy this vasomotor disturbance is of fundamental importance. What is left unexplained by these writers is the selective incidence of hemorrhage into the internal capsule.

That lesions of the cerebral arteries occur frequently in the infectious diseases of childhood and leave behind as residual, hemiplegia, is the conclusion reached by Ford and Schaffer (*Arch. Neurol. & Psychiat.*, Sept., 1927). These authors minimize the role of encephalitis as a factor in the puzzling acute organic brain changes in the diseases of childhood and stress the importance of arterial disease in childhood.

ENCEPHALITIS

Little of fundamental importance or of great originality has appeared in the literature concerning this important condition. Cruchet (*Brit. Med. Journ.*, Sept. 24, 1927) shows that the slowness of movement of the Parkinsonian state which so frequently follows encephalitis is independent of the stiffness or hypertonia. As is well known, slowness of movement, stiffness, and, in many instances, tremor, constitute the essential symptoms of this sequel of encephalitis. The value of scopolamin is in proportion to the stiffness of hypertonia, since it tends specifically to abolish it. It has, however, no effect whatever on the slowness of movement.

It has become inevitable that every chronic organic nervous disease shall be treated by fever therapy. Marcus, Kling, and Höglund use relapsing fever inoculation in chronic epidemic encephalitis. They report that 60% of cases are improved, of which percentage about half were decidedly helped and the others slightly improved. In the review of the original article, (it is in an inaccessible Swedish journal) the types of cases are not given, so that it is impossible to form any judgment on the matter. A priori, the reviewer is not convinced.

J. M. Sagaze (*Bulletin Medical*, 41:17, p. 500, 1927) believes that arsenic treatment gives the best results in prolonged encephalitis and that the best form of arsenic is arsylin. The reviewer is unable to say just what this drug is.

E. Juster (*Presse medicale*, 35, 1927, p. 54) believes that a daily administration of stramonium datura in sufficiently strong doses lessens the most distressing symptoms of chronic encephalitis. (*Rev. Neur.*, 1927, Vol. 2, page 812-13).

GENERAL PARESIS

No new developments have occurred in the treatment of general paresis. The writers on the use of malaria continue to express a guarded optimism. Characteristic of the group of workers of this type is Bunker (*Am. Journ. of Psych.*, Oct., 1927). It is apparent from their work that a large number of remissions occur, that the cases must be carefully selected, and that there is a certain mortality to be expected from the treatment alone and independent of the paretic process.

Results of similar type are reported from the use of relapsing fever (L. Benedek and F. Fulcsar—*Deutsche Ztschr. f. Nervenh.*, Vol. 98, 1927). They report 50% of improvement in 100 cases with varying degrees of remission and a considerable mortality, 15%.

Non-specific portein has also been used, the material being typhoid vaccine intravenously injected (Kunde, Hall, and Gerty—*J. A. M. A.*, Oct., 1927).

Schwab and Cady (*Am. J. Syph.*, Jan., 1927) report further on their use of tryparsamid. They believe that this preparation is more valuable than malaria, and give the extraordinary figures of 78% of paretic cases arrested or improved.

The reviewer believes that where many remedies are recommended for any disease this is prima facie evidence that in the long run none of them has any great claim to specific value. Personal experience does not warrant anything like the optimism at present expressed in some of the literature concerning the value of malaria, tryparsamid, or non-specific protein therapy. General paresis still remains an unsolved therapeutic problem, although there can be no doubt that under treatment remissions occur much more frequently than we have hitherto believed to be the case in the untreated patients. It must be remembered, however, that we now diagnose general paresis in those milder cases which escaped notice in earlier days, since we have in the routine lumbar puncture a method for obtaining information which was totally lacking or little used, even as late as 10 years ago.

VENTRICULOGRAPHY

A very good review of the indications for and technic of ventriculography, which is playing so large a rôle in the diagnosis of brain disease, especially brain tumor, is that of Francis C. Grant (*Radiology*, Nov., 1927). After giving the technic of the procedure together with excellent illustrations indicating the types of change found, he concludes:

"Ventriculography in experienced hands is not a hazardous procedure. By its use it is possible accurately to determine the position of otherwise unlocalizable intracranial tumors. But this method should be used only when all others have failed. Technically, in our opinion, the most important single factor in avoiding errors in interpretation of the X-ray plates is the complete removal of the fluid by bilateral ventricular tap, and the injection of air into each lateral ventricle separately. In reaching a conclusion, only obvious defects which are apparent on all films should be considered. In spite of its dangers, in spite of the possible errors in technic which may render abortive attempts at localization, ventriculography may afford us more positive information about the situation of the lesion than any other procedure. It is our firm conviction that no patient should be given a hopeless prognosis and sent away to die as comfortable as may be because we are unwilling to risk a mortality through the use of air injection. Until we have attempted ventriculography we have no right to tell that patient that he has an unlocalizable intracranial neoplasm and is beyond our help."

SCIATICA

An interesting and useful report on the treatment of sciatica is that of Fritz Kraus (*Med. Klin.*, Feb. 18, 1927). Apparently he had had good results in intractable cases by the use of the x-ray, even where the etiological background was not discovered.

EPILEPSY

It has long been a tradition in the medical literature that the epileptic has a personality makeup which is different from that of the average individual. The reviewer has always been skeptical that any such makeup exists before the epileptic attacks by their frequency break down the personality. Notkin (*J. Nerv. & Ment. Dis.*, June, 1927) finds that the age of onset of the first convulsive seizures has apparently a direct bearing on the type of personality found, and this is true especially when the convulsive seizures occur in infancy or early childhood. The more remote from infancy is the first manifestation of epilepsy, the more normal the makeup.

Turner (*J. Neur. & Psychopath.*, Jan., 1927) denies the existence of a mentality characteristic of the potential epileptic, and believes that the course of the disease together with the fear, anxiety and uncertainty produced by the epileptic attack itself bring about what has been described as the epileptic personality. When a man is liable to be knocked unconscious anywhere and under all sorts of conditions, his whole world alters, and his whole reaction to that world necessarily alters.

Thom (*Am. J. Psychiat.*, April, 1927), writing on the frequency and importance of infantile convulsions, believes that a very large number of them are really epileptic, that a greater effort should be made to prevent their occurrence in early life, and that thereby epilepsy and mental deficiency would be prevented.

Lennox continues his excellent studies on the metabolism of epilepsy (*Arch. Neur. & Psych.*, Sept., 1927) 2. The Sugar Content of the Blood, and 3. The Blood Sugar Curve. He finds that while increase of blood sugar during convulsions exists, it would seem to depend on the presence of available glucose in the body. No other abnormality is found, nor is there any direct relation between the blood sugar level and seizures. He states that the data collected give no evidence of abnormality of carbohydrate metabolism that might in itself induce seizures. Thus far the only relationship that epilepsy has to biochemical change lies in the acid-base relationship.

MIGRAINE

A very interesting report is that of William Allan (*Arch. Neur. & Psych.*, Oct., 1927). Comparing the case histories of 400 cases of migraine with 4000 case histories of all other kinds, he concludes:

"1. Psychoses, psychoneuroses and epilepsy occur with the same frequency in migrainous as in nonmigrainous persons.

2. Migraine has not been observed to come from anything but migraine in the parents, nor to pass down to the children in any other form. More than 90% of my migrainous patients give a history of migraine in one or both parents; with one parent migrainous, half the children have been found migrainous; with both parents migrainous, more than three-fourths of the children have been found migrainous.

3. Migraine seems to be a condition entirely independent of the neuropathies here mentioned, and its inheritance seems to be as free of neuropathic taint as the inheritance of color of the eyes."

This is in line with the trend of all the really critical work in heredity. Those generalizations which postulate a diffuse vague heredity as back of unknown conditions are incorrect. Where heredity exists as a causal background for any disease condition, it is of a specific type. Any condition from an ingrowing toe nail to Dementia Praecox, can be declared to be hereditary, if enough other conditions are considered relevant in the disease history of the ancestors and collaterals.

The view that migraine is of gastrointestinal origin is strengthened by the work of Pasteur, Vallery-Radot and P. Blamoutier (*Bull. e. mem. d. hop. de Paris*, June 23, 1927). They "wished to investigate what benefit, if any, might be derived in cases of migraine by improving gall bladder drainage into the duodenum by means of a duodenal tube and injection of 33% magnesium sulphate solution." The treatment was carried out for a period of two years. In seven cases the results were excellent, in eight there was considerable improvement, and in seven failure. The seven patients who derived such great benefit had all complained of vomiting of bile and the authors concluded that their treatment is indicated in the presence of vomiting of bile and tenderness over the gall bladder.

Case Records of the Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 14271

ASCITES AT SEVENTEEN MONTHS

MEDICAL DEPARTMENT

A girl baby seventeen months old entered March 20. The complaints were abdominal distention and listlessness.

Six months before admission the mother was called home from work because the child appeared dull and did not play well. She found the child's abdomen was distended. The child was put in a hospital for three weeks without relief. On returning home she gradually improved and the distention became less. Four weeks before admission she again became listless and had loss of appetite and occasional vomiting. Once she became stiff and was thought to have a convulsion. She had also rubbed her head as if it ached. For two nights before admission she slept very poorly.

The child was well until the present illness. She had had only one or two colds and never any cough. When a few months old she had a brownish sticky discharge from both ears.

A maternal uncle died of tuberculosis. A paternal aunt had intestinal tuberculosis. The child had never been in contact with either. Her mother worked out at times, leaving the baby to be cared for by a woman who came to the house.

Clinical examination showed a poorly developed and nourished, pale and apprehensive baby with a noxious odor. The head showed a suggestion of prominent bosses. Ear drums normal. White plaque one centimeter in diameter on the right buccal surface. Tonsils large. Flaring ribs. Harrison's groove. Lungs clear. Interscapular dullness. Heart normal. Abdomen markedly protuberant, with prominent veins. Shifting dullness. Distention prevented palpation of liver and spleen. An umbilical sinus discharged brown foul smelling fluid with bubbles. Palpable masses. Vaginitis. Vulva red. Many areas of erthyema half a centimeter in diameter and excoriations on both buttocks. Pupils and knee-jerks normal.

Amount and specific gravity of urine not recorded. Findings normal. Blood: 11,600 leukocytes, 68 per cent. polymorphonuclears, 50 per cent. hemoglobin, reds 3,520,000. Wassermann negative. Tuberculin, human and bovine 1/1000, negative. Smear of fluid from umbilical sinus showed few cells but many organisms, bacillus coli and Gram-positive cocci predominating; culture, no growth. Stools: fats and some starch in one of two specimens.

X-ray of the abdomen showed no abnormality. The supracardiac area was not increased in width. The heart shadow was unusually wide, perhaps because the plate was taken at inspiration and the diaphragms were high. An examination with barium showed the stomach empty after six hours. The pyloric area appeared slightly narrowed but as far as could be determined was normal. Considerable barium was scattered through the colon as far as the descending portion. After twenty-four hours the head of the barium column was shown at the mid descending colon.

Temperature 98.4° to 102°, rectal, until March 29, then 98° to 99.5° for two days, then 98.4° to 101.1° with a terminal rise to 103°. Pulse 120 to 97. Respirations 30 to 71.

March 22 edema of the feet developed. A surgical consultant made a diagnosis of persistent Meckel's diverticulum, perhaps with associated partial intestinal obstruction. He thought operation was indicated but dangerous, and advised waiting until the patient was in a better condition. An oculist found the eye grounds difficult to examine but apparently normal.

March 25 the child was given a capsule of carmine. A slight tint of the dye appeared in the discharge from the sinus in twenty hours, and a definite red color the next day. The dye appeared in the stool in not more than twenty-two hours and three-quarters after ingestion.

March 28 there was an edematous area, not red, covering the left ear. It seemed to have started three days earlier in the angle of the jaw, probably in a gland. The throat and the other ear were normal. The temperature was 102°. The bases of both lungs showed slightly harsh breath sounds and decreased resonance.

During the next week the child did badly, lost weight and was lethargic. A lumbar puncture done March 30 gave clear colorless fluid, initial pressure 210 to 220, combined jugular compression 310, after removal of 13 cubic centimeters 120; six cells; globulin slightly increased, Wassermann negative, total protein 21, goldsol 1110000000, sugar 60. Edema of the extremities was quite marked. There was congestion of the bases of the lungs. April 5 the child died.

DISCUSSION

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

This is the sort of family history that we still take that I think is a waste of pen, ink, and paper. To put down tuberculosis in persons to whom the child was not exposed is according to our present knowledge putting down something that is irrelevant.

NOTES ON THE PHYSICAL EXAMINATION

I do not know the significance of the white plaque. Sick babies often have such things.

Harrison's groove, etc.,—in other words, rickets.

Shifting dullness, of course, if it is correct—and it is a very easy sign to find—is positive proof of fluid in the abdomen. There are not many causes of fluid in the abdomen of a young child.

We do not know where the masses are.

MISS PAINTER: They were apparently fecal masses.

DR. CABOT: I do not know much about children, but I should think the negative reaction to tuberculin would be of importance in ruling out tuberculosis, unless it is a very virulent process.

In the barium examination I suppose they were thinking of perforated peptic ulcer with peritonitis. There is nothing remarkable in this examination so far as I know.

I do not see how this surgeon made the diagnosis of Meckel's diverticulum before barium was given.

The action of the dye seems to prove that the umbilical sinus is connected with the gastro-intestinal tract.

I do not see that we have evidence of anything wrong from this lumbar puncture fluid.

DIFFERENTIAL DIAGNOSIS

I am out of my beat here. I do not know what is the matter with the baby. We seem to have evidence of a connection between the intestine and the umbilicus, and that seems to point towards a Meckel's diverticulum. There is no evidence of intestinal obstruction, which is the only harm that a Meckel's diverticulum gives, and we have apparently fluid in the abdomen, which I do not know how to explain.

Has the child tuberculous peritonitis? That would explain the fever and the fluid in the abdomen. Ordinarily one feels masses other than fecal masses when a child has a peritoneal tuberculosis, masses especially apt to be around the cecum.

Why are the legs edematous? Well, just fluid in the abdomen, if it is marked, by its interference with leg circulation will give edema of the legs. I do not know any better explanation than that.

Could we have a thrombosed vena cava? That would give fluid in the abdomen and edema of the legs. It seems, however, as if it would give more fulminating symptoms than we have here, and I do not see why it should be thrombosed anyway.

Have the vaginitis and vulvitis anything to do with the case? Conceivably, of course, a peritonitis might arise from that region. This might be the fluid of such a peritonitis. But that is a rare thing. The vast majority of those cases do not do anything serious to the organism and do not result in peritonitis. I do not believe it.

Almost all children who have anything die of bronchopneumonia. On general principles I think I had better say the child had bronchopneumonia, because almost every dying child does. But that is not a rational diagnosis. It is not the cause of death. It is simply something that babies get after they are weakened by something else.

So I do not know what the baby has. It does not seem clearly like anything that I have named, though I cannot rule out tuberculous peritonitis.

A STUDENT: How about the tuberculin test in tuberculous peritonitis?

DR. CABOT: That is against us.

A STUDENT: Would you have to consider congenital syphilis?

DR. CABOT: I do not see why.

A STUDENT: If you had cirrhosis.

DR. CABOT: Yes, syphilitic cirrhosis and fluid in the abdomen. But I think we ought to have other signs. I do not believe anybody could make a diagnosis of congenital syphilis with nothing in the skin, bones, or teeth or about the anus. I think we can rule it out. Syphilis is the most dangerous diagnosis one can make with a pathologist about. He almost never backs it up unless it is in the aorta.

A STUDENT: Do you make anything here of the fact that the dye did not appear in the stools up to that time?

DR. CABOT: No, I do not know enough about the test to make any inference from that.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Tuberculous peritonitis.
Meckel's diverticulum.

DR. RICHARD C. CABOT'S DIAGNOSIS

Possibly tuberculous peritonitis.

ANATOMIC DIAGNOSES

Tuberculosis of the lung.
Tuberculous salpingitis.
Tuberculous peritonitis.
Tuberculous ulcer of the ileum.
Abscess of the peritoneal cavity.
Umbilical fistula.
Miliary tuberculosis.

DR. MALLORY: The case is one of tuberculosis with tuberculous peritonitis playing the most important role. There was no Meckel's diverticulum. Also the tuberculous peritonitis was of the dry character, not of the fluid one. The fluid found in the abdomen was restricted to the anterior half. The omentum had walled off the abdominal cavity into two halves, the anterior inferior part of which was a large abscess cavity filled with fecal material, apparently the result of perforation of a small tuberculous ulcer of the ileum. So that the dye which had been

fed the patient passed through the ulcer of the ileum into this abscess cavity in the abdominal wall, and from there out through the umbilicus. Except for this abscess cavity it was a typical dry type of tuberculous peritonitis with widespread adhesions and the surfaces studded with tubercles.

The immediate source of the peritonitis appeared to be a bilateral tuberculous salpingitis. That seemed to be the oldest tuberculous focus except for one in the lung, which probably represents the primary source of infection. Of course the tubular ones were not primary. The course of infection in this case I imagine to be this: a primary infection in the lung going back many months or perhaps half a year, metastatic foci in the tubes at about the same time, extension from that to the peritoneum, miliary tuberberculosis following, and then perforation of a tuberculous focus in the ileum and the formation of a septic abscess in the peritoneal cavity, with discharge through the umbilicus.

CASE 14272

CAUSE OF DIARRHEA?

Surgical Department

An American widow forty-six years old came to the Emergency Ward December 21 complaining of diarrhea of seven months' duration. She was a broken-down nurse, apprehensive after having been given various bad prognoses.

About nine months before admission she became very tired. In May while going up-stairs she suddenly passed a large amount of mucus. After this she had almost constant diarrhea with incontinence. Until the past month there had sometimes been much blood mixed in the stools. Her physician writes that in August she was in another hospital for four weeks, growing steadily worse. Gastro-intestinal X-rays were negative. The stomach contents showed "no hydrochloric acid". No amebae were found in the stools. During the next three months she was treated with stovarsol by mouth with some relief until she developed a rash. For four months she had vomited almost everything taken. For ten days before admission she had had lead acetate and opium by mouth, with marked improvement in the character of the stools. She had grown steadily weaker. At present she could not sit up alone. Twice she had fainted while sitting up. Lately she had been very dizzy. Since the onset she had slept poorly. Her tongue had been a little sore at times, but fruits did not hurt it. A week or two ago she had a series of night sweats. The stools still showed mucus. Movements caused great pain in the rectum and abdomen, especially in the umbilical region, and particularly when medication gave formed stools. She thought she had not lost weight.

Her father and one brother died of nephritis, her mother of cancer, another brother of asthma and angina, one sister of epilepsy. A living sister had heart trouble.

The patient had had some dyspnea on exertion for years. She had never been pregnant. For a few years she had had pain and swelling of the joints. Before the menopause, two years ago, she often had diarrhea in association with menstruation.

Clinical examination showed an obese, pale, weak woman, drowsy and responding slowly. Slightly deaf. Skin and sclerae icteroid. Gray hair and eyes. Tongue smooth, atrophic, red. Apex impulse of the heart not seen or felt. No enlargement to percussion. Sounds somewhat tic-tac in quality. Rhythm normal. No murmurs. Pulses and arteries normal. Blood pressure 95/60 to 100/70. Lungs clear. Abdomen: slight generalized tenderness on an unsatisfactory examination. On rectal examination a very tender cleft was felt anteriorly. Pelvic examination showed a small amount of serosanguineous discharge. Vaginal walls reddened. Cervix in normal position, somewhat fixed. Os not made out. Skin of lower legs thickened, with brown areas a centimeter in diameter. Pupils normal. Knee and ankle jerks not obtained. Fundi: disc outlines indistinct. Cupping present. Myopia. Area of exposed choroid, temporal side of left disc.

Urine: normal amount, specific gravity 1.002 to 1.010, the slightest possible trace to a trace of albumin at two of three examinations, acetone at one. A specimen taken by catheter showed no albumin; sediment, no leukocytes, 7 to 10 red cells per field. Renal function 25 per cent. Blood: 11,550 to 8,050 leukocytes, polymorphonuclears 79 to 70 per cent., hemoglobin 45 to 55 per cent., reds 3,384,000 to 3,780,000. Two smears showed marked achromia, anisocytosis and poikilocytosis. Smear at entrance showed some large blue-gray red cells, no nucleated reds, reticulated cells 4 per cent., platelets diminished. Next day reticulated cells 1.3 per cent. December 23 many tailed and sausage forms, platelets abundant. Red cell diameter measurements: median slightly decreased, dispersion slightly increased. Wassermann negative. Nonprotein nitrogen 16 milligrams. Icteric index 5 to 6. Fasting contents of stomach: 85 cubic centimeters of dark watery, mucoid fluid. No free acid. Combined acid 2. Test meal: No free acid. Combined acid 6. Microscopic examination of both specimens negative. Neither showed macroscopic or occult blood.

X-ray examination showed that the barium flowed into the rectum in a lead-pencil streak to a point about the junction of the sigmoid, beyond which it could not be seen to pass. The descending colon also showed a lead-pencil filling to the hepatic flexure. No haustral markings could be seen. The rectal sphincter was incontinent; the barium flowed out as fast as it flowed in. The examination was unsatisfactory.

Temperature 98° to 99.4°. Pulse 75 to 103. Respirations normal.

Proctoscopy showed spasm, making it difficult to pass the proctoscope three inches. At that point the instrument met what seemed to be an annular constriction, apparently hypertrophied tissue, which bled very readily. Beyond this constriction the examiner could not see well, but thought the appearance was not that of ulcerative colitis. He found the liver edge easily palpable. A surgical consultant agreed with the proctoscopic diagnosis, and strongly urged operation.

December 29 operation was performed. The patient became pulseless on the table. That evening she died.

Discussion

BY EDWARD L. YOUNG, JR., M.D.

"Diarrhea for seven months with anemia" of course starts such a train of thought as to possible diagnoses that we are prepared for almost anything, because we at once think of primary anemia with the diarrhea that goes with it; of types of intestinal infections from amebae, parasites, tuberculosis; of neoplasm and chronic ulcerative colitis. Most of the conditions which we have mentioned carry with them more or less bad prognoses. And it is true, I think, that nurses and doctors often make bad patients, because they know just enough to get worried about their own cases and are unable to see the silver lining that may be present in the cloud.

Let us take up some of these symptoms. "Nine months before admission she became very tired." That will fit in with any one of the various conditions which we started with having in our minds. Then she passes a large amount of mucus from the bowel. That at once directs our attention to the intestinal tract. After this she has almost constant diarrhea with intense incontinence and bloody mucus with the stools. That does not help us a great deal. That is, we expect blood in the stool more often when there is an ulcerative lesion such as is caused by neoplasm or by colitis.

How far are negative gastro-intestinal X-rays to be relied upon? Certainly one set of gastro-intestinal X-rays is never to be relied upon implicitly as regards disease either in the stomach or in the intestinal tract. It must be remembered that such X-rays, although they are the most important single bit of evidence in regard to disease in this region, can entirely fail to show cancer of the stomach and cancer of the intestine. Or it can demonstrate almost without question an inoperable carcinoma of the stomach which at operation does not exist at all. So that X-rays, however important, must fit in with the rest of the clinical facts rather than be taken as final evidence against other clinical data.

"The stomach contents showed no hydrochloric acid", always a point in an argument for pernicious anemia or for malignant disease of the stomach.

"No amebae were found in the stools". They were hunting again for that cause of colitis.

The night sweats will go with weakness, whatever the cause.

It is unusual for a patient with colitis, or for a patient who has gone on to this point with malignant disease, not to lose weight, particularly with chronic colitis.

I do not see anything in that past history that is of particular importance to us. The fact that she had diarrhea with menstruation means nothing more than an irritable large bowel with a moderate degree of colitis, so that the pelvic congestion of menstruation started up a diarrhea.

Because of the lack of any note of pelvic conditions I think we can assume that nothing abnormal was felt.

Again they are hunting for evidence of pernicous anemia in looking for the retinal hemorrhages.

The blood pressure is low. It does not seem to me that it is any lower than it is entitled to be at this stage of the game, when she has been weakened by disease. I think it is not Addison's disease, although Addison's disease does have intestinal symptoms and we have here the brown areas on the lower leg.

The urine I think is essentially negative. I believe it rules out nephritis, certainly nephritis at a stage where it might in any way be responsible for diarrhea and for anemia.

Far be it from me to pass on that blood examination absolutely; but it does not seem to spell pernicious anemia. I think we can get some expert opinion on that when I am through. The blood examination at any one time might not make it possible for one to make an accurate diagnosis as to the presence or absence of pernicious anemia. Certainly I have seen two cases in the past year, one of them in my past service at the hospital, where I took over a "pernicious anemia" from the medical service and corrected it by surgery. It may well be here that the blood picture at this time is not so characteristic as it has been at some other time.

"Non-protein nitrogen sixteen milligrams." That backs up the renal function test. It is essentially normal.

"The barium flowed into the rectum in a lead pencil streak." The barium must have passed, because we are told that the descending colon also showed a lead pencil filling to the hepatic flexure. That means that there is an extreme degree of colitis present. Malignant disease would presumably be localized to a relatively short portion of the bowel. For instance, if the malignant disease started at about the junction of the sigmoid, where this barium stopped, it would be a carcinoma of the sigmoid and it

would not extend to the hepatic flexure. Nevertheless the X-ray showed that there was trouble as far as the hepatic flexure. If it were malignant disease and the barium got by, there would be not this constriction but either a normal or a somewhat dilated bowel behind it. This is the characteristic appearance, as I read it, of the extreme stages of colitis, particularly an ulcerative colitis.

The surgical man is now looking for evidence for himself by proctoscopy, just as the medical men were looking for evidence for themselves. I am glad they made a diagnosis by proctoscopy. And what they say I can not agree to for this reason: this is the end stage of some condition; I believe it is impossible, in the face of the spasm, the edema and inflammatory proliferation of an extreme type of colitis, to recognize anything when you look into such a picture. Certainly I have seen cases where I could not make a definite diagnosis. This may or may not be a malignant constriction, so that I confess I do not take seriously this statement that they thought the appearance was not that of ulcerative colitis. On the other hand it does back up my belief that there is more of an inflammatory or proliferative process than is at all consistent with pernicious anemia.

Let us consider what the various possibilities are.

Malignant disease of the large intestine? Possibly, but it seems to me there is a great deal against it in that X-ray examination and the fact that the patient has not lost weight.

The various types of colitis. They hunted for amebae and did not find them. They should have been found if the amebae were the cause of as active a condition as this is. The mere fact that they gave the patient a drug supposed to help that condition and there was improvement means nothing, as I see it. A slight amount of improvement in any condition will follow almost any medication if the patient thinks it is going to help.

Tuberculosis, a proliferative process most frequently found in the cecum, does occur. I have never seen it extend in this fashion.

Syphilis. I have never seen syphilis in the large bowel. The more I talk of it the more I think it is a text book condition and not an actual thing.

The type of ulcerative colitis that we most often meet is the type that Bargen* connected up with a diplococcus three or four years ago, what we used to call an idiopathic ulcerative colitis. That would produce this picture except for the fact that she has not lost weight. It is a disease that nearly always results in extreme loss of weight.

Is it pernicious anemia alone? It seems to me impossible to say that that could cause the local condition in the large bowel.

Can we say that there is more than one disease present? Until I find out whether or not any authority will make a diagnosis on the blood picture I can not say whether it could be pernicious anemia plus one of these other conditions. Certain it is however that an ulcerative colitis can go with carcinoma. It is not common; it does occur.

There is one other condition which I have not mentioned, that is a diverticulitis of the large bowel. That will generally show in X-ray. It generally is localized, though not always. It seems to me very difficult to fit that in, although that may have carcinoma develop in it. From the stomach symptoms and the lack of hydrochloric acid I do not believe we have any right to say carcinoma of the stomach. X-ray was negative, but that does not always tell us the story.

These are the things that come to my mind most readily. I think my one best guess is ulcerative colitis. Whether there is a carcinoma at the base of that I should rather doubt.

Now the conclusion; and when I get as far as this I see where the surgeon comes in. The medical men have studied so long they are confused and turn the patient over to the surgeon either to kill or cure. The question of treatment in this condition is important, and extremely important in this way. How long are we going to allow a patient with this condition to go on without an operation? If they say this is a pernicious anemia and that accounts for the whole story, and the medical man is sure of it, very well. I have no wish to interfere at all. If however they can not make their diagnosis, a proctoscopy should be done very much earlier than this.

Assuming there was the evidence of disease in the large bowel, it seems to me that the only thing that would have helped this patient out would have been a side tracking of the fecal contents. Early in the disease of chronic colitis medical treatment and some local treatment are undoubtedly of benefit in many cases, and undoubtedly they are of no benefit in many cases.

I think that the halfway operations of cecostomies are of very little value. If you have reached a stage where you have to do something it is complete side tracking, so that the large bowel is put completely at rest and medication is used.

I should like to ask before I read the operation for the medical opinion of Dr. Cabot as to whether that blood spells pernicious anemia.

DR. CABOT: I do not think it is pernicious anemia.

DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Ulcerative colitis.

PRE-OPERATIVE DIAGNOSIS

Abdominal malignancy.

*J. D. Bargen, J. A. M. A. Aug. 2, 1924, page 332; Arch. Int. Med. Dec. 1925, page 818.

OPERATION

Ether. The abdomen was opened through a low left rectus incision. A hard mass could be felt impacted in the pelvis which on delivery proved to be a pedunculated fibroid. The pedicle was clamped and the fibroid removed. The colon was thickened and edematous. The liver was normal on palpation. The abdomen was closed.

When the patient was put in the Trendelenberg position the pulse became of poor quality and very rapid. On listening at the apex the rate was found to be 240. The operation was terminated and the abdomen closed as soon as possible. The patient was given intravenous glucose. She was returned to the ward in fair condition, although the pulse rate was still very rapid.

FURTHER DISCUSSION

DR. YOUNG: This operation should have been done a good many months earlier. Proctoscopic examination is the most important examination that could be done in the face of a colitis, whether it be due to amebae or be the ulcerative type of colitis, because there the proctoscopic examination will make the diagnosis easier than anything else. It is only in the early stages that we can be sure of isolating the Bargen bacillus.

A PHYSICIAN: Do you think that tumor in the pelvis had any relation to the main condition?

DR. YOUNG: Entirely a side issue.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Fibroid uterus.
Auricular fibrillation.

DR. EDWARD L. YOUNG'S DIAGNOSIS

Ulcerative colitis.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Chronic colitis, non-ulcerative.

2. *Secondary or terminal lesions.*

Obesity.
Fibrous myocarditis, slight.
Fatty infiltration of liver and pancreas.
Arteriosclerosis.
Operative wound, myomectomy of uterus.

DR. TRACY B. MALLORY: A chronic colitis was found extending the entire way from the rectum around to the hepatic flexure throughout its entire length. The diameter of the large intestine was between two and three centimeters, as compared with the normal of five or six. The mucosa was not deeply ulcerated at any point. Nothing was found to suggest amebic disease. I think it might be classed as one of the typical chronic colitis cases, which with the accumulated evidence now seem to be due to streptococci of one type or another.

The other findings were not remarkable except for extreme obesity, very marked fat infiltration of the right side of the heart and extreme fat infiltration of the pancreas. Only occasionally little islands of pancreatic tissue could be found in a huge mass of fat in that region. This is just the type of case, even when operation is not postponed so long as it was in this case, where we are very apt to get death within a few hours after an operation that does not seem to be extremely severe. Whether the fat in the heart actually has anything to do with it or not I think is quite uncertain; but we do unquestionably find fat infiltration of the myocardium in a great many of these cases that die very shortly after abdominal operations.

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THE PROBLEM OF ANOREXIA

A LARGE part of every pediatric practice today is made up of children who will not eat. They may be sick but they generally are not; sometimes they are undernourished, but more often they are up to average weight; practically always they are from the better classes of society.

Obviously this is a behavior problem, for its causes are much more frequently psychological than physical. The root of the matter generally lies in a false conception of the child's physical needs as regards caloric and food volume intake, in a failure to appreciate that these needs are individual to the child, and in an adherence by the parent to the idea of average weights and heights as standards of normality, without regard to the habits or the habitus of the individual child.

Generally these children are coaxed, threatened or bribed to eat with the result that each meal becomes a battle. Either both mother and child are unhappy, which is not conducive to appetite, or the child is happy because he is the center of the stage, and because he is winning a victory—and both these ends are achieved by his continued failure to eat.

So common has the problem of anorexia become among those who have to do with children, that a valuable little book on the subject has been presented by Dr. Charles A. Aldrich, of Chicago.

In this book, designed principally for parents but of equal interest to the physician, the general theories and principles of appetite and hunger and their causes are discussed; a discussion leading up to the main points of prevention and treatment. Here we will receive moral support in dictating the only logical policy—that of letting the child who will not eat go without food until he becomes hungry.

Many valuable and practical suggestions, however, are offered. Encourage the child to believe that no one cares if he or she does not eat. With negativistic children, in fact, best results are to be gained by letting them believe that you do not want them to eat. Keep the amount of food restricted to such a point that the patient is never quite satisfied; nothing will stimulate appetite more quickly than this. Enforce a time limit on meals; allow no distractions at meal times. Above all foster happy associations with meals and meal times; do not let them become unpleasant occasions.

Hunger is physical, but a few mouthfuls of food may satisfy it. Appetite is a psychic phenomenon; it is dependent upon mental associations and it is the proper type of associations which must be fostered.

TESTING FOR BOVINE TUBERCULOSIS

THE report of the Directors of Animal Industry for Massachusetts shows 24,957 clean cattle in Massachusetts in which no reactors were found in 1927 which is a gain of 7462 over the previous year. 50,429 tuberculosis tests were made in 1927. This testing is only done on request of the owner which shows commendable interest on the part of owners except as provided in section 33B which provides that:

"Whenever not less than eight-five per centum of the cattle permanently kept in a town are, upon application of their owners, being tested for bovine tuberculosis under the supervision of the director, the director may apply the same test to all other cattle in such town." The power thus invested in the Director has never been invoked because it was felt that this procedure would work an injustice to the cattle owners until such time as a larger indemnity (comparable to that allowed by other states) has been provided.

Of 421 head of cattle quarantined or reported for 1927 lesions were found in 291. The total number of reactors in 1927 was 4369. These are potential sources of bovine tuberculosis in young people. It is a pity that a state should be prevented from more thorough eradication of this danger.

SOMETHING NEW IN CYTOLOGY?

A CONTRIBUTION to cytology which is of special interest has recently issued from the Harvard laboratories.* Prefaced ironically with Emerson's familiar lines that a curiously selected group of writers have "left nothing for scalpel or microscope to reveal in human or comparative anatomy," it is recorded as a new observation that seven-sided epithelial cells are more apt to divide than six-sided, and for a very intelligible reason—they are larger. Can there be any air of novelty in what seems so elementary?

The study is based upon the single layer of cells—the simple columnar epithelium—which covers the rind of the cucumber. That tissue was chosen since a hot-house cucumber is growing decidedly faster than a seven-day rabbit in utero, though rabbits enjoy a reputation for rapid multiplication. The epithelium of the cucumber, when looked down upon, has something the pattern of the hexagonal tiling of a bathroom floor. Let the floor be completed and the attempt made to insert one additional hexagonal tile in its midst and enlarge the area of the floor by that extent—let one try to picture clearly how that might be accomplished—and the morphological problem of cell division in a simple epithelium is brought home with all its difficulties. Apparently no attempt has previously been made to show in any precise way how the cells solve this problem of spacing. It has been enough to say that it is done by division and new cells are duly interspersed.

In the paper which we are reviewing, it is stated that the average number of sides of the cells in the cucumber epithelium is minutely less than six (5.996) and this deviation is accounted for. Reasonably disregarding it, a hypothetical epithelium is proposed, consisting entirely of hexagons of uniform area. If such cells are made to grow, perhaps passively and somewhat unequally, by the expansion of the watery sap-filled interior of the cucumber, the average area of the hexagonal sections of the prisms must steadily rise. But division occurs in the largest hexagons, and thereby the gradual increase in average area, if not wholly prevented, is at least greatly retarded.

In the accompanying figure (Fig. 1, *A*), the central hexagon is considered to have concentrated in itself the expansion in its district due to the growth of the underlying cells, and to have acquired an area of 5.5 units in comparison with the average area of all the surrounding hexagons, which measure 4 units. At the average area of 5.5 units it was found that the hexagonal cells divide, and usually into a pair of pentagons, as shown in Fig. 1, *B*, at the same time making two adjoining cells heptagonal. This is an inescapable geometrical pattern, merely disguised by the irregularity of the actual cells. Now the average area of the cells is found to vary as their number of sides minus 2. The two pentagons produced by the division of the hexagon have a combined area half as large again as the parent hexagon; each has an area of 3 units. The heptagons grow to areas of 5 units. Thus it is found that whenever a cell in this epithelium divides, six new sides and the area of an average hexagonal cell are added to the pattern, but the sides and area are distributed among four cells. In the general way pictured in the figure, the problem of adding a new hexagonal tile in the midst of the mosaic is solved, and an approach is made to presenting it with geometrical precision.

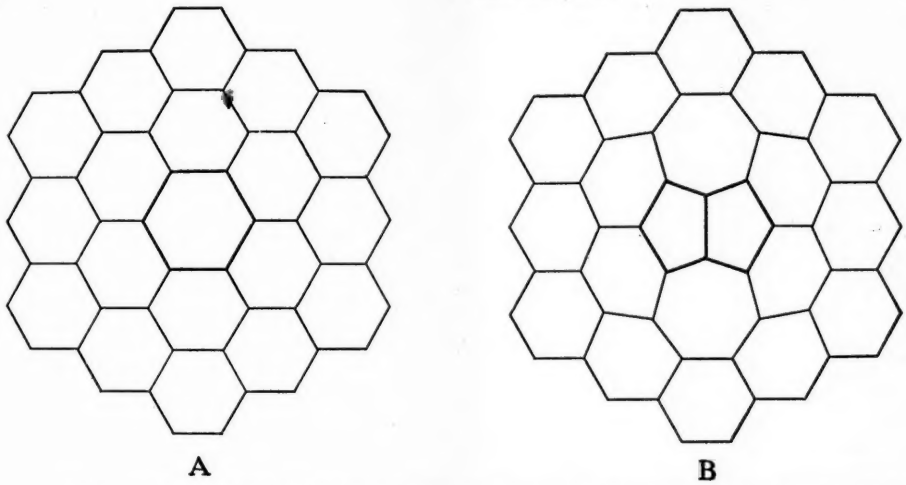

FIG. 1. Diagram of cell division in a simple epithelium. The hexagons in A are assumed to be of the average size of resting cells, except the central hexagon, which shows the average size of the hexagons that divide. B, the result of division, which is typically to produce two pentagonal cells which are small, and two heptagonal cells which are large, of the average sizes here drawn to scale.

Of the important corollaries, only two may be mentioned. Cell division having introduced seven-sided cells into the pattern, which are larger than the six-sided cells, it may be ex-

*Lewis, F. T.: The correlation between cell division and the shapes and sizes of prismatic cells in the epidermis of Cucumis. Anat. Record, May, 1928, Vol. 38, p. 341-376. (A preliminary paper on "the effect of cell division on the shape and size of hexagonal cells" appeared in the Anat. Record, 1925, Vol. 33, p. 331-355.)

pected—and it is fully confirmed by observation—that seven-sided cells divide more frequently than six-sided. Eight-sided cells, the manner of whose production is quite evident (being hexagonal cells which have had *two* sides subdivided, by the division of *two* adjacent cells) are larger than heptagons and divide with still greater relative frequency:—5 per cent. of the heptagons present in the cucumber epithelium are dividing, 15 per cent. of the octagons, and nearly 40 per cent. of the nonagons. In all of these shapes the dividing cells average larger than the resting cells, though the difference between resting and dividing sizes becomes very slight in cells with many sides. This certainly is a promising approach to the problem of cell division, by defining with some precision the conditions under which it occurs.

Another corollary is that the growth of a cell is a community affair. Let a cell receive another side by the division of an adjacent cell. It must then grow, and since the nuclear volumes vary in accordance with cell volumes, the *nucleus* of such a cell must grow, occasioned by a cell division wholly outside of its own boundaries.

At least one epithelium has been described on a reasonably satisfactory volumetric basis. What histology will be, when—if it proves possible—the various human tissues are all described with similar precison is an interesting speculation. Already it is shown that *some* cells are not too irregular for mathematical formulation, and the suspicion is inevitable that much crudity still lurks in current descriptive histology. When this has been removed by studies of the type under discussion, the physical determination of the significance of cells should be measurably nearer.

PSYCHIATRY AS A DEPARTMENT OF MEDICINE

THE article by Dr. Adolf Meyer in this issue deserves adequate consideration by all practitioners whose work is not confined to the more restricted specialties. Dr. Meyer reiterates the challenge of mental hygienists that doctors must consider the mind as well as the body. But he also makes it evident that psychiatry is an integral part of medicine.

More and more it is becoming evident that physicians in general must recognize that psychiatry is no distant specialty to be accepted or ignored at will, but that it can be used in the care of almost every case. The failure of the profession to investigate and make wise use of modern conceptions in this field will be followed, almost certainly, by the invasion of the field of medicine by technicians who do not possess any adequate training in physical disease. It is quite possible to disagree with Dr. Meyer; it is entirely legitimate to think that he has taken time in the curriculum which might be better spent upon dermatology or pediatrics, or diseases of the ductless glands. It is, however, entirely unreasonable to ignore his contribution and then deplore the fact that psychotherapy is practiced by the unqualified. Dr. Meyer's plea is at bottom one for the reintegration of the practice of medicine in the hands of properly trained doctors who are not afraid to approach mental abnormalities as fearlessly and as sanely as they now do those of the body.

MILK INSPECTION IN BERKSHIRE COUNTY, MASS.

UNDER "Correspondence"* our readers will find a copy of a letter from Dr. George H. Bigelow, Commissioner of Health, which should interest physicians, health officials and intelligent laymen.

If this plan is endorsed and encouraged by the people of Berkshire County it will be of great influence in stimulating corrective action in other sections of the State.

Unfortunately many laymen and some doctors are not in sympathy with the corrective control of the production and handling of milk. Our farmers are somewhat antagonistic (to put it mildly) to official supervision of milk production because the feeling has grown that the views of health officials if consistently applied to milk production will drive the dairy business from the State of Massachusetts. There are certain conditions relating to out of the State competition which seem to justify this feeling. On the other hand since unclean and otherwise contaminated milk has been shown to be the cause of many deaths we are faced with the necessity of choosing the lesser evil of requiring safe milk even if it involves hardship during the period of readjustment.

The JOURNAL contends that the people must have safe milk as well as safe water supplies and freedom from all infections as far as sanitary science can be applied to the problems of health.

This movement on the part of the State of Massachusetts to make a demonstration of the necessary changes which may be found to be required in order to protect the people should lead farmers to co-öperate in the development of the best possible details incident to the production of milk. The State in turn must protect the dairy men from unfair competition. The people in their relation to the problems must be willing to pay the price which will enable farmers to maintain herds of healthy animals and care for milk produced in the way necessary to insure a wholesome product.

This movement is in line of improving quality which is commendable and with the hope that it will be one stage in the process of education which will finally lead to pasteurization of all milk used for human consumption.

*Page 391.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

GLOVER, EUGENE C. A.B., M.D. Harvard Medical School, 1928. Assistant Resident Physician, Thorndike Memorial Laboratory of the Boston City Hospital. His subject is: "The Newer Knowledge of Cancer Metabolism and Some Other Aspects of Cancer Research". Page 351. Address: 486 Brookline Avenue, Boston.

MEYER, ADOLF. Honorary LL.D. University of Glasgow, 1901 and Clark University, 1909; M.D. University of Zurich, 1892. Professor of Psychiatry in the Johns Hopkins University and Psychiatrist-in-Chief to the Johns Hopkins Hospital. His subject is: "The 'Complaint' as the Center of Genetic-Dynamic and Nosological Teaching in Psychiatry". Page 360. Address: Johns Hopkins Hospital, Baltimore, Maryland.

MORRISON, L. B. M.D. University of Vermont College of Medicine, 1902. Consulting Roentgenologist Collis P. Huntington Memorial Hospital, Consulting Roentgenologist Palmer Memorial Hospital, Roentgenologist New England Deaconess Hospital, Roentgenologist New England Baptist Hospital, Robert B. Brigham Hospital, and the Faulkner Hospital. His subject is: "X-ray in Treatment of Certain Diseases". Page 371. Address: 370 Marlborough Street, Boston.

MYERSON, ABRAHAM. M.D. 1908. Professor of Neurology, Tufts College Medical School; Visiting Neurologist, Boston City Hospital; Visiting Neurologist, Beth Israel Hospital. His subject is: "Progress in Neurology". Page 376. Address: 412 Beacon Street, Boston.

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METABOLISM

THE practitioner who would best serve his Clientele must at least know what the newer terms, which from time to time are being brought into use in the profession, signify. He may not be able to apply the knowledge covered by those terms in his everyday practice but their use should not be a foreign language to him. It is very likely true that many of these terms will enjoy a short vogue because experience may demonstrate them to have been of no real significance. On the other hand a certain few will prove their worth and be added to the physician's armamentarium. Many a diagnostic "short cut" which is merely that and nothing else, had best be only so regarded and for that reason employed very cautiously. Perhaps a majority of these are useful because they supply confirmatory evidence of a positive or negative nature.

Such information is valuable but should always be sought upon that understanding, never in lieu of the observation which it is intended to confirm. Our fingers can be trained to such delicacy of touch, that few fractures ought to get by us but the X-ray should be used to confirm such a diagnosis, if it is available, chiefly for medico-legal reasons. But the man who neglects to attempt to make the diagnosis of fracture without any examination, except by means of the X-ray, is more blameworthy than he who fails to use it at all. So it is with many a test. The generation and distribution of the energy of the body is distinguished by certain measurable reactions. One of these is basal metabolism. In certain diseased conditions a determination of departure from that which may be regarded as a normal rate conveys information which is of importance but usually in a confirmatory way, at least so far as our present knowledge carries us. In other words what basal metabolism has to teach us clinically is largely along the lines of guidance to therapy rather than in diagnosis. The study of metabolism is of very great interest and will doubtless be productive of results having far reaching clinical significance. At present it is being carried on in research laboratories in a "direct" way for scientific purposes and in clinics in an "indirect" way for practical purposes, following the plan suggested by Benedict in 1908. As thus practised it is a sort of calorimetry. The safeguards with which it is necessary to surround patients in order that psychic influences may not vitiate these results, indicates to some extent the unreliability of data of this nature. So far it has been in the study of endocrine disturbances that these observations have been of the most significance. The literature however is full of references to every sort of condition which has been, is being, or will be studied in this way, both normal and pathological. From this class of observations there is little that is practicable for practitioners, considerable that is of significance to researchers and much that is of no value to any one. To much of the catechising one must submit to in a doctor's office these days, which if answered in the affirmative might impeach the character of oneself or one's respected ancestors, must be added, "what is your basal metabolism?". So far this may apparently be answered without sinister implication. In the course of time an answer to this question may mean something more than it does at present. In the interval let us hope it will be kept from being included among those procedures which commercialized practitioners add to their diagnostic equipment.

MISCELLANY

RÉSUMÉ OF COMMUNICABLE DISEASES REPORTED TO THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH, JUNE, 1928

GENERAL PREVALENCE

The total number of cases of communicable disease for June was not unusual.

More cases of influenza were reported for June,

1928, than any previous June since the disease was made reportable.

The incidence of diphtheria was the lowest for any June on record. There has been a decline in the reported incidence of measles.

The reported incidence of anterior poliomyelitis, German measles, chicken pox, lobar pneumonia and whooping cough was normal. The incidence of scarlet fever and mumps was relatively low.

Thirty-four cases of typhoid fever were reported for the month. Of these, nineteen were reported in the Chicopee outbreak. Except for the outbreak figures the incidence of this disease was not unusual.

RARE DISEASES

Anterior poliomyelitis was reported from Amherst, 1; Boston, 1; Brockton, 1; Cambridge, 1; Fall River, 1; Northampton, 1; Wakefield, 1; Westfield, 1; total, 8.

Dog-bite requiring anti-rabic treatment was reported from Arlington, 5; Boston, 3; Braintree, 1; Chelmsford, 3; Danvers, 2; Lowell, 18; Mansfield, 1; Marblehead, 1; Quincy, 3; Revere, 8; Winthrop, 3; total, 48.

Dysentery was reported from Chelsea, 2; total, 2.

Encephalitis lethargica was reported from Boston, 3; Middleton, 1; Northampton, 3; total, 7.

Epidemic cerebrospinal meningitis was reported from Boston, 3; Cambridge, 1; Fairhaven, 1; Gardner, 1; Salem, 1; Westfield, 1; Worcester, 1; total, 9.

Malaria was reported from Boston, 1; total, 1.

Pellagra was reported from Boston 1; total, 1.

Septic sore throat was reported from Boston, 10; Belmont, 1; Cambridge, 1; Fall River, 1; Malden, 1; Quincy, 1; Winthrop, 1; Woburn, 1; total, 17.

Tetanus was reported from Amesbury, 1; Boston, 2; total, 3.

Trachoma was reported from Boston, 3; Medford, 1; total, 4.

MONTHLY REPORT OF CERTAIN COMMUNICABLE DISEASES

Diseases	Cases in entire population				Case rates per 100,000 population		
	June, 1928	June, 1927	Prosodemic index	Epidemic index	June, 1928	June, 1927	Expected rate‡
All causes	7,199	7,752	—	—	166.5	181.6	—
Anterior poliomyelitis	8	11	10*	.8†	.2	.3	.2
Diphtheria	261	388	342*	.8†	6.0	9.1	7.9
Measles	2,919	1,734	4,428*	.7†	67.5	40.6	102.4
Pneumonia, lobar	305	317	222*	1.4†	7.1	7.4	5.1
Scarlet fever	788	1,587	673*	1.2†	18.2	37.2	15.6
Tuberculosis, pulmonary	434	457	398*	1.1†	10.0	10.7	9.2
Typhoid fever	34	17	27*	1.2†	.8	.4	.6
Whooping cough	517	406	824*	.6†	12.0	9.5	19.1
Chicken pox	569	874	—	—	13.2	20.2	—
German measles	53	79	—	—	1.2	1.9	—
Influenza	98	16	—	—	2.3	.4	—
Mumps	439	1,044	—	—	10.2	24.5	—
Tuberculosis, other forms	83	94	—	—	1.9	2.2	—

*This Index is an attempt to estimate the number of cases based on the trend during the past years which can be expected to occur, and is for the purpose of comparison with the number of cases which actually did occur.

†This ratio expresses how prevalent the disease is compared with the index mentioned above; 1.0 indicates that the actual number of cases equals the expected number. A larger number means a greater prevalence, and a smaller number a lesser prevalence than expected. Thus, 2.0 would indicate twice the expected number of cases, and .5 half the expected number of cases. The method used to determine the indices is described in the August 18, 1927, issue of the *Boston Medical and Surgical Journal*.

‡Calculated from the Prosodemic Index.

GIFTS TO UNIVERSITY OF PENNSYLVANIA

A gift of $250,000, it has been announced by *Science*, has been offered to the University of Pennsylvania by Edward B. Robinette, alumnus and banker of Philadelphia. The gift will be used as a foundation for the establishment of a clinic for the study, treatment and prevention of diseases of the circulatory system, and will eventually be increased to $1,000,000.

An anonymous gift of $100,000 has also been received to carry on a study of the leukemias and lymphomata in the Henry Phipps Institute. The study will be under the direction of Dr. Eugene L. Opie, director of the institute's laboratory and of the department of pathology of the University of Pennsylvania School of Medicine.

BIBLIOGRAPHY OF MEDICAL BOOKS

A new and valuable department has been added to the *London Medical Press and Circular*, consisting in a quarterly bibliography of books on medicine and the allied subjects. The volume of publications of this sort has now increased to such an extent that any compilation of this nature will fill a definite need. Thus, in the initial bibliography published July 11, 1928, and covering the period from April to July, nearly 400 titles are listed.

The list, which even at this number is not exhaustive, has been compiled for the Medical Press and Circular by the Sales Department of Bailliere, Tindall & Cox, of London.

JUNIOR SAFETY WORK IN MASSACHUSETTS

The Massachusetts Safety Council has organized 100 junior safety councils including thousands of members, each of whom became eligible for membership by performing two "acts of safety." Their fourth annual spring rally, held in Boston in April, was attended by 5,000 children. A series of safety lessons prepared by the parent body is being used by 6,000 teachers in 27 cities and towns, and safety instruction has been started in 300 playgrounds in a number of cities.—*Bulletin Children's Bureau.*

CORRESPONDENCE

MILK INSPECTION IN BERKSHIRE COUNTY, MASS.

The Commonwealth of Massachusetts
Department of Public Health
State House, Boston

August 16, 1928.

Editor, N. E. JOURNAL OF MEDICINE:

Dear Doctor:

As a result of the Lee epidemic and at the insistence of the Governor we obtained an appropriation for a six months milk inspection demonstration in Berkshire County which, if successful, may have a profound influence in improving milk inspection all over the State. Except for the few larger areas this inspection is practically non-existent, and yet a great indifference is descending on the Berkshire people who want to forget the matter as soon as possible.

I am sending the enclosed letter to all the doctors in the Berkshire County and in the near future we intend to have a public meeting to try to rouse interest. Could you perhaps run this and at the same time if possible call editorial attention to it?

The probable sound solution for milk inspection for small communities which cannot handle it economically is on the county or district basis.

The small amount of money at present obtained in places for part-time milk inspectors would not be taken away from them by the demonstration as they can continue their own milk inspectors in addition to appointing ours temporarily.

Thank you for any support you can give us.

Cordially yours,

GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

To the Board of Health:

Gentlemen:

At the direction of the Governor we obtained an appropriation in the supplemental budget sufficient to organize a six months milk inspection demonstration for Berkshire County with two objects in view:

1—To improve the quality and safety of the milk supply in the County.
2—To recover the confidence of the public in this region.

We have held two meetings with members of the boards of health of the County and the interest demstrated is very slight. The Department has no desire to force this matter upon the communities that are unwilling to accept it and yet we feel that it is of great importance.

I should be glad if you would sign the enclosed postal card indicating whether or not your Board is interested in the following matters:

1—Inviting us to include your community in the demonstration.
2—Appointing inspectors of the demonstration as temporary milk inspectors for your town without expense.
3—To adopt standard milk ordinances which the Department is drawing up with a locally appointed committee representing the boards of health of Adams, North Adams, Pittsfield, Great Barrington, Stockbridge and Lee.

If interest does not exist in your or other communities sufficient to warrant the demonstration the money will of course be returned to the Treasury.

Yours truly,

GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

To the Physicians of Berkshire County:

Dear Doctor:

At the direction of the Governor we obtained an appropriation in the supplemental budget sufficient to organize a six months milk inspection demonstration for Berkshire County with two objects in view—first, to improve the quality and safety of the milk supply in the County, and second, through this to recover the confidence of the public in this region. We have had two meetings, to the first of which all the boards of health of the County were invited and at the second the fifteen that might be most interested. At neither of these was any particular interest demonstrated. We are writing to all the boards of health of the County to know whether they are interested (1) in having the demonstration include their community; (2) in appointing inspectors of the demonstration as temporary milk inspectors for their own town without expense; (3) adopting standard milk ordinances which the Department is drawing up with a locally appointed committee representing the boards of health of Adams, North Adams, Pittsfield, Great Barrington, Stockbridge and Lee.

If co-öperation cannot be obtained the project will of course be dropped and the money returned to the Treasury. However it seems to us that here is an opportunity of cleaning up the almost entirely unsupervised and in many instances filthy conditions that exist at present, which will be to the best interest not only of the citizens of the County but to the milk producers themselves. Certainly no industry can continue to carry such catastrophes as that recently happening in Lee and live. May we ask that you get in touch with your local health authorities in order to urge on them the importance of co-öperating in this demonstration?

Yours truly,

GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

PROTESTS CRITICISMS OF THE BOARD OF REGISTRATIONS IN MEDICINE

To the Editor of the
NEW ENGLAND JOURNAL OF MEDICINE,
126 Massachusetts Avenue,
Boston, Massachusetts.

Dear Sir:—

Adverse criticism of the Board of Registration in Medicine has been too prevalent of late.

Because I believe most of this criticism mistaken, and because it would be very unfortunate to have a continued misunderstanding, I am moved to write to you.

Most of the criticism has been to the effect that the board has committed itself to price fixing for medical services.

Nothing, I think, could be further from the fact, and I say this after having talked with members of the board.

Their concern is with ethics, not prices, and save

insofar as a physician's money affairs might constitute obvious mis-conduct, they are not likely to interest the Board at all, and I am assured that said Board has no notion of being driven or cajoled into taking up a matter,—the supervision of fees, as such, —which would entail endless trouble, is not the job for which the Board was created, and perhaps hardly comes within its jurisdiction.

The decision of the Board in a recent case cited "gross mis-conduct" in which, among other things, fees and their size did come up for discussion. On the appeal of the physician against this decision of the Board, his attorney tried, pretty successfully, to make it appear to be a matter of dollars only, and the Supreme Court decision did in fact concern itself with the fee question, as such—the Court, not the Board.

This may settle the question of the Board's *right* to rule on fees, but does in no sense change what the Board has said or done, or means to do.

It is to be hoped that this body, the Board of Registration, may consider it proper to define its attitude in a communication to the profession.

Until then I submit that most of the criticism I have heard is based on a wrong supposition as to what and why the Board decided and reported as it did.

Very truly yours,

FREDERIC J. COTTON.

WHO SHALL PAY FOR ANTI-RABIC TREATMENT

Aug. 13, 1928.

Editor, NEW ENGLAND JOURNAL OF MEDICINE,
Sir:—

The little spat between Dr. Bigelow and Dr. Lane as to who should pay for the treatment of persons bitten by supposedly rabid dogs is very interesting from an academic and ethical point of view, but both seem to ignore the fact that the question is settled by statute.

Dog-bite requiring anti-rabic treatment is included in the list of diseases dangerous to the public health issued by the Department of Public Health and G. L., Chap. III., Section 116, says "Reasonable expenses incurred by boards of health or by the commonwealth in making the provision required by law for persons infected with smallpox or other disease dangerous to the public health shall be paid by such person or his parents, if he or they be able to pay, otherwise by the town where he has a legal settlement, upon the approval of the bill by the board of health of such town or by the department of public welfare."

FRANCIS GEO. CURTIS, M.D.,
Chairman, Newton Board of Health.

THE ANNUAL REGISTRATION OF PHYSICIANS

August 13, 1928.

Editor, NEW ENGLAND JOURNAL OF MEDICINE,
126 Mass. Ave., Boston, Mass.

Dear Editor:

I read with great interest the article on Annual Registration of Physicians and wish to express my approval of such a law.

There is a very important phase namely the practising of medicine by druggists and pharmacists. It is about time for the medical profession to supervise such practises. On many occasions, pharmacists refill prescriptions when it is definitely written on the blank not to be repeated; at other times, they actually prescribe for ailments and give other medical advice. It is more deleterious to the community at large when pharmacists persist in diagnosing diseases and prescribing for them, than for duly graduated doctors of medicine practising without a license. We should have a law passed in this state prohibiting such a practise by pharmacists. A medical practise act such as the State of New York has and if possible with more teeth, would meet with approval by the medical profession.

BERNARD ZUCKERMAN, M.D.

DR. NATHAN SMITH

Editor, NEW ENGLAND JOURNAL OF MEDICINE,

After reading the delightful paper on Dr. Smith in your issue of July 12, I am led to say that the only sources of accuracy concerning the foundation of the Dartmouth Medical School, and of the reasons for Dr. Smith deserting it for Yale, are to be found in the "Life of Dr. Lyman Spalding," Originator of the U. S. Pharmacopoeia. From those letters we learn, that the School was opened November 20, 1797 (not 1798 as so often stated) and that there were two lecturers, Dr. Smith, the Veteran and Dr. Spalding, a recent graduate at the Harvard Medical School, born in Cornish and an assistant to Dr. Smith whilst practising in that village.

The N. Y. "Medical Repository" Vol. 2, p. 339, advertises also the two lecturers by name; the elder physician for every topic except Chemistry, the younger man for that branch alone.

The reasons why Dr. Smith abandoned Dartmouth for Yale were as stated in his letters already alluded to; that he was threatened with arrest for dissecting a grave-robbed body. This threat followed with others of a similar nature, led to the resignation of Dr. Smith from Dartmouth.

It will forever remain a source of medical regret that the General Educational Board declined my suggestion of 1921, that they should endow the Medical School at Bowdoin liberally, in Honor of the Centenary of its Foundation by that famous teacher, Dr. Nathan Smith.

JAMES A. SPALDING, M.D.,
Portland, Maine.

THE DEPARTMENT OF PUBLIC HEALTH WILL DISTRIBUTE REPRINTS OF ARTICLES DEALING WITH ANTERIOR POLIOMYELITIS

The Commonwealth of Massachusetts
Department of Public Health
State House, Boston

July 27, 1928.

Editor of THE NEW ENGLAND JOURNAL OF MEDICINE,

The Department has a limited number of reprints of the following articles on Infantile Paralysis and would be glad to send any or all to any physician in the state requesting them:

1. The Early Diagnosis and Prevalence of Non-paralytic Anterior Poliomyelitis, by Eliot H. Luther, M.D., Harvard Infantile Paralysis Com.
2. The Diagnosis of Poliomyelitis, by Dr. J. P. Leake, United States Public Health Service.
3. Muscle Training in The Treatment of Infantile Paralysis, by Wilhelmine G. Wright.

Yours very truly,

GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn St., Chicago, Ill.,
July 27, 1928.

Managing Editor,
THE NEW ENGLAND JOURNAL OF MEDICINE,

In addition to the articles enumerated in our letter of June 29th, the following have been accepted:

Chicago Dietic Supply House
Cellu Soy Bean Flour
Cellu Soy Crisp

Mead Johnson & Co.
Mead's Powdered Boilable Lactic Acid Milk

Parke, Davis & Co.
Cotton Protein Extract Diagnostic—P.D. & Co.; Cottonseed (Cake) Protein Extract Diagnostic—P. D. & Co.; Goat Hair Protein Extract Diagnostic—P. D. & Co.; Human Hair Protein Extract Diagnostic—P. D. & Co.; Kapok Protein Extract Diagnostic—P. D. & Co.; Peptone Protein Extract Diagnostic—P. D. & Co.; Poplar Pollen Protein Extract Diagnostic—P. D. & Co.; Sunflower Pollen Protein Extract Diagnostic—P. D. & Co.; Sweet Vernal Grass Pollen Protein Extract Diagnostic—P. D. & Co.

Yours truly,
W. A. PUCKNER, *Secretary,*
Council on Pharmacy and Chemistry.

NOTES ON NATIONAL AFFAIRS

From Our Regular Correspondent

Although Congress is in adjournment and the United States Supreme Court and other courts in recess, the executive bureaus of the national government continue to be sources of material of interest and importance to the medical profession.

MATERNITY AND INFANCY

Federal subsidies to the states for the promotion of the welfare and hygiene of maternity and infancy, under the terms of the so-called Sheppard-Towner Law, will cease on June 30, 1929, seven years after they began. The Federal Maternity and Infancy Act was originally adopted on November 23, 1921, to take effect for a five-year period ending on June 30, 1927, but Congress was subsequently induced to extend the operation of the act for another two years, though with the distinct understanding that the law would be repealed on that date, and a provision to this effect was written into the act making the extension. According to a recent ruling by the Controller-General, states having unexpended balances of federal funds on June 30, 1929, must return them to the United States Treasury.

Just before the first session of the 70th Congress adjourned on May 29, 1928, Representative Newton of Minnesota introduced a bill, H. R. 14070, to provide a child welfare extension service in the United States Children's Bureau, which has been administering the Maternity and Infancy Act. This measure authorizes more federal subsidies to the states, with the difference, however, that the states are not required to match the funds allotted by the national government, but would be permitted to do so. A million dollars a year would be appropriated, of which all but $50,000 for purposes of administration, would be distributed among the states. This bill was referred to the Committee on Interstate and Foreign Commerce and will be before the House at the second session which convenes next December and lasts until March 4, 1929.

The Children's Bureau has recently been deluging the press with statements concerning the need for maternity and infancy work in the states, the value and results of the activities which have been undertaken with the aid of the federal appropriations, and the benefits to be expected from a continuance of child welfare services. It seems as if these interesting statements appear in almost every issue of the *United States Daily*, under such headings as "Reductions Shown in Maternal and Infant Mortality", "Communities Urged to Adopt Programs of Child Health Work", and the like.

TAX ON INCOME FROM PRIVATE HOSPITALS

A company built a hospital and then made an agreement with a certain physician to operate it, this doctor to hold the post of Superintendent for life or until voluntary resignation. He was charged an annual rental by the hospital, which also collected fees for services rendered to his patients.

The question arose as to whether the company, a corporation, could deduct income from the hospital in computing its federal income tax. The Income Tax Unit of the Bureau of Internal Revenue has given its opinion (I. T. 2421) that, since the hospital is a private one operated for the benefit of this particular physician and his own appointees, and is not a public hospital accessible to all reputable physicians, no exemption can be granted.

STANDARDS FOR CLINICAL THERMOMETERS

A commercial standard for clinical thermometers has been devised by the Commercial Standards Unit of the United States Bureau of Standards and will go into effect on October 1, 1928. The standard has been approved by the conference of manufacturers, who are, however, allowed until March 30, 1929, to dispose of their old stocks.

The Bureau of Standards has also prepared standards for three sizes of ship medicine chests, the assistance of the United States Public Health Service having been enlisted in this work. These standards have been submitted to the American Marine Standards Committee for approval.

THE EFFECT OF WAR GASES

A board of medical officers of the United States Veterans' Bureau has issued a preliminary report on the residual effects of gassing in warfare. As a result of a study of 837 cases, with 37 deaths, the conclusions are reached that ten years after the gassing there are still residua, the most common being pulmonary, though active tuberculosis is not often a prominent residuum. Chlorine gas when used alone was found to be less likely to leave after effects han were mustard or phosgene gases.

THE DANGERS OF A PEACE-TIME GAS

A one-reel educational motion picture film entitled 'Carbon Monoxide: The Unseen Danger" has been completed by the United States Bureau of Mines, 'as a means," says a statement from the bureau, 'of reducing the heavy annual death rate caused by that insidious and almost universal poison gas, car-

bon monoxide." Copies of this film, which is available for showing by schools, churches, clubs, labor unions, and civic, business, and medical agencies, may be obtained from the Pittsburg Experiment Station of the Bureau of Mines, Pittsburg, Pa.

DISABLED EMERGENCY MEDICAL OFFICERS

Medical officers of the World War who suffered physical disability of 30 per cent. or more by virtue of their war service are now entitled by law to compensation. They should apply at once to the United States Veterans' Bureau, Washington, D. C., or to any regional office for an application form and then send it filled out direct to the bureau office in the national capital.

RECENT DEATHS

LOWNEY—Dr. Dennis Joseph Lowney, of New Bedford, a Fellow of the Massachusetts Medical Society, died at Santa Monica, California, June 17, 1928, aged 55.

He was a graduate of Saginaw Valley Medical College, Michigan, in 1900, and joined the Massachusetts Medical Society from New Bedford in 1906.

GALVIN—Dr. George William Galvin, founder and for 16 years head of the Emergency Hospital in Kingston Street, Boston, a graduate of Harvard Medical School in the class of 1878, died at his home in Boston, August 16, 1928, after an illness of six weeks.

NOTICES OF MEETINGS

THE FOURTH CLINICAL CONGRESS OF THE CONNECTICUT STATE MEDICAL SOCIETY

New Haven, September 18th, 19th, 20th, 1928

Advance Program

Sprague Memorial Hall, College and Wall Streets.

The hours scheduled are Daylight Saving Time.

COMMITTEES

Committee on the Clinical Congress

D. Chester Brown, Danbury, Chairman; Milton C. Winternitz, 333 Cedar St., New Haven, Secretary; Arthur B. Dayton, 333 Cedar St., New Haven, Assist. Sec'y; Frank H. Wheeler, 27 Perkins St., New Haven, Treasurer; E. Terry Smith, Hartford, President of Society; Charles W. Comfort, New Haven, Secretary of Society; William H. Carmalt, New Haven, Chairman of Council.

Committee on Program

George Blumer, New Haven, Chairman; Luther K. Musselman, 215 Whitney Ave., New Haven, Secretary; Samuel C. Harvey, John E. Lane, Arthur Morse, Walter R. Steiner, Daniel C. Patterson, George M. Smith, Daniel Sullivan, Arthur B. Dayton, Howard S. Colwell.

Committee on Arrangements and Finance

Herbert Thoms, 330 Cedar St., New Haven, Chairman; David R. Lyman, New Haven, Secretary; A. Nowell Creadick, Thomas H. Russell, Arthur R. Weed, Israel Kleiner, Creighton Barker.

Committee on Enrollment and Publicity

Robert L. Rowley, Hartford, Chairman; Creighton Barker, 129 Whitney Ave., New Haven, Vice-Chairman; Amos T. Harrington, 179 Allyn St., Hartford, Secretary.

For Fairfield County—William A. LaField, Bridgeport, Chairman; William J. Tracey, Norwalk, Vice-Chairman.

For Hartford County—Donald B. Wells, Chairman.

For Litchfield County—Edward R. Kelsey, Winsted, Chairman.

For Middlesex County—James Murphy, Middletown, Chairman.

For New Haven County—David R. Lyman, New Haven, Chairman; Fred W. Comstock, New Haven, Vice-Chairman; Arthur A. Johnson, Waterbury, Vice-Chairman.

For New London County—Daniel Sullivan, New London, Chairman.

For Tolland County—Thomas F. Rockwell, Rockville, Chairman.

For Windham County—Robert C. Paine, Thompson, Chairman.

Committee on Periodic Physical Examinations

Orville F. Rogers, New Haven, Conn., Chairman; Thomas H. Denne, Thomas P. Murdock, Stanley H. Osborne, H. LeBaron Peters, Max Mailhouse.

PROGRAM

The opening session of the Fourth Clinical Congress of the Connecticut State Medical Society will be held in Sprague Memorial Hall, on College Street, at the corner of Wall, at 11:00 A. M., Tuesday, September 18, 1928; Dr. D. Chester Brown, President of the Congress, presiding.

11:00 A. M.—*Acute Conditions in the Lower Abdomen in the Female.* Dr. Walter W. Chipman, Professor of Obstetrics and Gynecology, McGill University. A presentation of the clinical pictures of appendicitis, salpingitis and ruptured tubal pregnancy and their medical and surgical treatment.

12:00 M.—*Drug Eruptions.* Dr. Fred Wise, Professor of Dermatology and Syphilology, New York Post-Graduate Medical School and Hospital. An illustrated discussion of the eruptions of the skin and mucous membrane caused by drugs in common use.

2:00 P. M.—*Regular Health Examinations.* Dr. Bertram L. Bryant, Secretary of the Maine Medical Association. A discussion of the technique of physical examinations of healthy persons.

3:00 P. M.—*The Nature, Specificity, Sensitiveness and Practical Value of the Kolmer-Wassermann Reaction.* Dr. John A. Kolmer, Professor of Pathology in the Graduate School of Medicine in the University of Pennsylvania. A study of the nature of the Wassermann reaction and its technical and biological sources of error. The significance of unexpected and weakly positive reactions. The comparative sensitiveness of the Wassermann and precipitation reactions and the clinical value of positive and negative results.

4:00 P. M.—*Ultra-Violet, Natural and Artificial.* Dr. Frank B. Granger, Assistant Professor of Physical Therapeutics, Tufts Medical School. A comprehenhensive discussion of the use and application of ultraviolet light as a therapeutic measure.

5:00 P. M.—*What Causes Constipation.* Dr. Walter C. Alvarez, Associate Professor of Medicine, University of Minnesota, Mayo Foundation. Constipation, reviewed from the standpoint of the physiologist who wants to know where the transporting mechanism slows down and why.

7:00 P. M.—Dinner at the New Haven Lawn Club. *What the Mind Does to the Body.* Dr. James J. Walsh, Medical Director, Fordham University School of Sociology. The mind can produce the symptoms of many diseases and discomforts in the body and when it does, only the mind can cure such affections.

WEDNESDAY, SEPTEMBER 19TH

10:00 A. M.—*Medical and Surgical Problems in Prostatic Obstruction.* Dr. Hugh H. Young, Director James Buchanan Brady Urological Institute, Johns Hopkins University. A broad consideration of the pathology and complications resulting from enlargement of the prostate with the associated symptoms and signs. Clinical and laboratory studies required to make decision as to proper treatment to be employed. Pre-operative treatment. Choice of operation. Post-operative treatment, surgical and medical.

11:00 A. M.—*The Present Status of the Functional Tests of the Liver.* Dr. Leonard G. Rowntree, Professor of Medicine, University of Minnesota Graduate School of Medicine. A critique of the various tests of the liver function and the interpretation of them in the light of clinical experience.

12:00 M.—*Compression Fractures of the Spine.* Dr. Robert B. Osgood, John B. and Buckminster Brown Professor of Orthopaedic Surgery, Harvard Medical School. A discussion of the so-called compression or crush fractures of the spine, with fractures of the transverse and spinous processes without cord involvement. Illustrated.

2:00 P. M.—Immediately following luncheon, the Congress will convene in the new Brady Surgical Building of the New Haven Hospital, at the corner of Congress Avenue and Cedar Street. The entire afternoon will be occupied with practical clinical demonstrations and elective classes of instruction embracing many diversified subjects. In order that the groups attending these demonstrations may not be unwieldy, it is requested that members of the Congress designate which classes they wish to attend on the card provided for that purpose. Time will be available for attendance at three classes.

7:00 P. M.—Dinner at the New Haven Lawn Club. *Patent Medicines and the Public.* Dr. Arthur J. Cramp, Director of the Bureau of Investigation of the American Medical Association. An illustrated expose of the "Great American Fraud." A discussion of the methods of modern advertising in the creation of the demand for proprietary remedies by stimulating self-medication. Illuminating facts concerning the origin and price of testimonials. The relation of the Food and Drug Acts to the selling of nostrums.

THURSDAY, SEPTEMBER 20TH

10:00 A. M.—*Etiology and Early Diagnosis of Bronchiectasis and Lung Abscess.* Dr. David T. Smith, Bacteriologist and Pathologist, New York State Hospital for Incipient Pulmonary Tuberculosis, Ray Brook. A review of recent clinical and pathological investigation into the etiology of pulmonary abscesses and the bacteriology of such lesions.

11:00 A. M.—*Serum Sickness and Serum Accidents.* Dr. George M. MacKenzie, Director of Medical Service, Mary Imogene Bassett Hospital, Cooperstown, N. Y. A detailed consideration of the symptoms, mechanism and treatment of serum diseases. The dangers incident to serum treatment, the identification of individuals susceptible to serum reactions, and the methods of administering serum to hypersensitive individuals.

12:00 M.—*Varicose Veins and Varicose Ulcers.* Dr. John Homans, Assistant Professor of Surgery, Harvard Medical School, and Surgeon to the Peter Bent Brigham Hospital. A consideration of the indications for treatment of varicose veins and their complications, varicose ulcer and thrombo-phlebitis, especially emphasizing surgical procedures that have proven permanently successful.

2:00 P. M.—*Glaucoma.* Dr. George S. Derby, Williams Professor of Ophthalmology, Harvard Medical School. A lantern slide demonstration of the changes found in glaucoma and the treatment of that disease.

3:00 P. M.—*Colon Irrigations.* Dr. Walter A. Bastedo, Attending Physician, St. Luke's Hospital, New York. A critical discussion of the objects of colonic irrigation, and an outline of approved methods. The use of irrigations in mucous colitis and other diseases.

4:00 P. M.—*Modern Surgical Treatment of Trigeminal Neuralgia.* Dr. Bryon Stookey, Assistant Professor of Neurology and Neurological Surgery, Columbia University. An illustrated discussion of the diagnosis of trigeminal neuralgia and other painful affections of the face. Presenting the relative value of various forms of therapy including drugs, alcohol injections and physiotherapeutic measures. The surgical approach and technique of differential section of the dorsal root of the nerve and the biological basis for the operation.

5:00 P. M.—*Shoulder Pain.* Dr. Mather Cleveland, New York Orthopaedic Hospital. An outline of the causes of painful shoulder and a demonstration of the features of the shoulder joint by anatomical preparations.

MEETING PLACE

Unless otherwise noted, all sessions of the Congress will be held in Sprague Memorial Hall, corner of College and Wall Streets. The dinner meetings will be held at the New Haven Lawn Club, Whitney Avenue and Sachem Street.

ACCOMMODATIONS

Yale University has given the use of one of its dormitories for members of the Congress. Rooms in this dormitory may be occupied for $2.00 each night. Many of the rooms accommodate more than one person and an effort will be made to assign rooms with room-mates of your own choosing if reservations are made early. Hotel reservations should be made directly with the hotel.

MEALS

Luncheons may be taken at the New Haven Lawn Club where a special table d'hote luncheon will be served on each of the three days of the Congress. Breakfasts may be obtained in restaurants in the immediate vicinity of Sprague Hall. It is anticipated that all members of the Congress will attend. Tickets for the dinner meetings at the Lawn Club on Tuesday and Wednesday evenings will be $2.00 each.

GARAGE AND PARKING

Day and night storage place for cars of members will be provided throughout the days of the Congress in the University Garage in Temple Street.

TELEPHONE

Twenty-four-hour telephone and messenger service will be maintained at Sprague Hall and the dor-

mitory. Number: Liberty 7100, Clinical Congress Extension.

FEE

The fee for the Congress is Five Dollars. This includes admission to all sessions of the Congress and garage accommodations. It does not include the use of the rooms of the dormitory, which will be charged for at the rate of $2.00 per night, or any meals.

REGISTRATION

If you expect to attend the Congress, it will be appreciated if you will REGISTER NOW. Your check for $5.00 should accompany the card. Address all inquiries regarding registration and accommodations to Dr. Creighton Barker, 129 Whitney Avenue, New Haven, Conn.

THE GRADUATE FORTNIGHT OF THE NEW YORK ACADEMY OF MEDICINE

August 15, 1928.

Considerable interest has been shown by the medical profession throughout the country in the first "Graduate Fortnight" of the New York Academy of Medicine, on the problem of aging and of old age, which is scheduled for October 1st to 14th, with two sessions daily at the Academy, and clinical demonstrations and lectures at thirty teaching hospitals.

Among the speakers to be present from abroad are Sir Farquhar Buzzard, Regius Professor of Physic at Oxford, and Dr. Vittorio Putti, orthopedic physician of Bologna.

Two sessions daily will be held at the Academy, comprising the following program:

SESSIONS AT THE ACADEMY

October 1st. *Afternoon.* Opening Session. Introductory Remarks. Dr. Samuel W. Lambert, President, New York Academy of Medicine, and Dr. Louis I. Dublin, Statistician Metropolitan Life Insurance Company. The treatment of arthritis deformans of the hip. Professor Vittorio Putti, Bologna, Italy. *Evening.* The doctor—Trainer or healer? Dr. George E. Vincent. Carpenter Lecture. Pathological processes in aging. Dr. Alfred S. Warthin.

October 2nd. *Afternoon.* Importance of anatomical pathways in diseases of middle life and old age. Dr. Harrison S. Martland. Postponement in the individual process of aging. Dr. Linsly R. Williams. Clinical aspect and management of old age from the practitioner's point of view. Dr. Charles F. Collins. *Evening.* Syphilis in elderly persons. Dr. George M. MacKee. Diseases of the skin in old age. Dr. Howard Fox.

October 3rd. *Afternoon.* Arterial diseases of the brain and cord. Dr. Foster Kennedy. Spinal cord diseases. Dr. Edwin G. Zabriskie. *Evening.* The aging of the heart muscle regarded from a general biological point of view. Dr. Alfred E. Cohn, Dr. Alexis Carrel. Arteriosclerosis and aneurism. Dr. E. J. G. Beardsley.

October 4th. *Afternoon.* Dietetics in old age. Dr. Samuel A. Brown. Pharmacology in old age. Dr. Alexander Lambert. Alcohol in old age. Dr. Samuel W. Lambert. *Evening.* The relation of disorders of ductless glands to senescence. Dr. William Engelbach, Engelbach Clinic. Menopausal and post-menopausal conditions in women. Dr. Benjamin P. Watson, Sir Farquhar Buzzard.

October 5th. *Afternoon.* Gastro-enterological problems. Dr. Arthur F. Chace. Food and food habits. Dr. Solomon Strouse. *Evening.* Traumatic surgery and the problems of age. Dr. John J. Moorhead. Osteomalacia and Paget's disease. Dr. Edwin Allen Locke. The conditions of the rectum in old age. Dr. Jerome M. Lynch.

October 8th. *Afternoon.* Pneumonia in old age. Dr. William R. Williams. Bronchitis and asthma. Dr. Frederick T. Lord. *Evening.* Tuberculosis. Dr. Lawrason Brown. Climate and the aged. Dr. Gerald B. Webb. Psychoses in old age. Dr. Menas S. Gregory.

October 9th. *Afternoon.* X-ray and radium in the problem of old age. Dr. Francis Carter Wood. Special aspects of neoplasms in the aged. Dr. James Ewing. Diseases of the arteries of the extremities. Dr. Leo Buerger. *Evening.* Aging of the human brain. Dr. Frederick Tilney. Apoplexy. Dr. Bernard Sachs.

October 10th. *Afternoon.* Hypertension. Dr. Herman O. Mosenthal. Nephritis in old age. Dr. Nellis B. Foster. *Evening.* Harvey Lecture. Senescence and rejuvenescence from a biological standpoint. Professor C. M. Child. Present status of the problem of the so-called rejuvenation. Dr. Charles R. Stockard.

October 11th. *Afternoon.* The myocardium. Dr. John Wyckoff. Angina pectoris. Dr. Harlow Brooks. *Evening.* Infectious diseases and old age. ——. Arthritis and old age. Dr. Russell L. Cecil.

October 12th. *Afternoon.* Liver and biliary passages. Dr. Franklin W. White. Digestive problems. Dr. Thomas R. Brown. *Evening.* Carcinoma of the larynx. Dr. John E. MacKenty. Diseases of the eye in old age. Dr. William H. Wilmer.

Programs of special clinics and clinical demonstrations have been arranged in the following hospitals, which are co-öperating in the Fortnight:

DOWNTOWN GROUP

Bellevue Hospital, Functional diagnosis, infectious diseases, tuberculosis, anaesthesia, fractures, treatment of arteriosclerosis of senile heart, gangrene and amputation, handling urinary cases, surgical problems in the aged, diseases of the chest shown by X-ray, eye conditions, ear conditions, psychopathic cases, diabetes and endocrinology.

Beth Israel Hospital, Functional diagnosis, cardiovascular diseases.

French Hospital, Asthma and hay fever, the relation of allergy to skin diseases in old age, roentgenology.

New York Hospital, Asthma and hay fever, metabolism, traumatic surgery, Paget's disease, myocardial conditions, hernia in the aged, post-operative care, post-operative lung conditions, peripheral arterial diseases, peptic ulcer.

New York Eye and Ear Infirmary, Operative clinics.

New York Infirmary for Women and Children, Results of operations in the aged, artificial menopause, operative gynecology.

Post Graduate Hospital, Urological diagnosis, functional diagnosis, cardiology, radiology, blood

chemistry, dermatology and syphilology, traumatic surgery, obesity, diabetes, prostatic hypertrophy, G. E. diagnosis and treatment, pernicious anemia.

Ruptured and Crippled Hospital, Fractures, hernia, postural deformities, arthritis, paralysis of later life, physical therapy.

St. Vincent's Hospital, Dermatology and surgery.

University and Bellevue Clinic, Dermatology and syphilology, cisternal puncture, histological X-ray, grantz-ray, cryocautery and phototherapy demonstrations.

MIDTOWN GROUP

Cancer Institute, Cancer of female genitalia, cancer of the rectum and colon, cancer of the breast, cancer of male G. U. organs, radium and X-ray therapy, diathermy and radium therapy.

Central Neurological Hospital, Arterial diseases of the brain, arthritis, cerebral hemorrhage, thrombosis, senile epilepsy, Parkinson's disease, the mechanism of sensory disturbances following lesions of peripheral nerves, senile chorea, senile tremors, the mechanism of sensory disturbances following lesions of brain, fractures, the mechanism and interpretation of pupil inequality in disease.

City Hospital, Heart disease—the rôle of infection, hypertension, kidney disease, diabetes, arthritis, neurological conditions, gynecological conditions, genito-urinary diseases, skin diseases, surgical problems—surgical intervention under regional and spinal anaesthesia, fracture of the hip, X-ray as an aid in diagnosis.

Knapp Memorial Hospital, Operative and dry clinics.

UPTOWN GROUP

Beth David Hospital, The hypertension syndrome, the climacteric syndrome, the coronary artery syndrome.

Fifth Avenue Hospital, General medicine—pneumonia and infectious diseases, general surgery, general medicine—peptic ulcer, surgical specialty—G. U., surgical specialty N & T, surgical specialty—orthology, neurology, cardiology, syphilology, dermatology, asthma, anatomy and motor phenomena of the stomach, pathology of peptic ulcer, correlation of pathology and roentgenology, pulmonary tuberculous chest lesions.

Harlem Hospital, Fractured skulls, pneumonia, eye examination, graphic records, diabetes, physical diagnosis, X-ray findings and rating, contagious diseases, practical diets, spinal puncture, standard treatment, diseases of the iris, nephritides, antipneumonia serum, cataract and glaucoma, examination of cardiac patients, prognosis, intracranial hemorrhages, anoxemia, consideration of albuminuria, mitral valve diseases, hypertension, neurology, oxygen chamber and its application in pneumonia, eye lesions, examination of cases, cardiac factor in hypertension, peptic ulcer, sickle cell anemia, cancer of gastro intestinal tract, cholecystitis, cholelithiasis and periduodenal cholecystic adhesions, parasitic anemia, albuminuria, etiology, biliary functional tests.

Jewish Memorial Hospital, Arthritis deformans, lecture—hearing defects, lecture—relating to food in old age and longevity, lecture—operation risks, skin diseases, lecture and case presentation—uterus after menopause, lecture—constipation and allied disorders, clinic and lecture—endocrine glands—arteriosclerosis and senile gangrene, clinics or courses in rectal diseases.

Joint Disease Hospital, Arthritis, orthopedics.

Lebanon Hospital, Prostatic hypertrophy, prolapsus uteri, endocrine disturbances.

Memorial Hospital, Organic changes—basis of tumors, medical problems in diagnosis and treatment of tumors, management of cancer of the breast, rectal cancers, adenoma and carcinoma of the prostate, neoplasms of genital tract in female, malignant bone tumors, cancer of the stomach, treatment of intraoral cancer, special characters of tumors, diagnosis of cancer of breast, melanoma or melanotic sarcoma, cancer of the penis and bladder, neoplasms of genital tract in female, cancer of thyroid and lungs, leukemia and lymphosarcoma, care of patients suffering from intraoral cancer.

Montefiore Hospital, Neurology—syphilitic and vascular lesions of nervous system, pulmonary diseases, physiotherapy—technicalities and indications of methods, hypertension and arteriosclerosis, cancer—special reference to radiotherapy, nephritis and diabetes—lectures and presentation of patients.

Mount Sinai Hospital, Arteriosclerosis and hypertension, cardiography, arhythmias, gynecology, prostatic hypertrophy, physical therapy, skin neoplasms, tumors of the lungs.

Presbyterian Hospital, Physical therapy (six one-hour lectures with demonstrations), heart disease, gangrene, hypertension and nephritis.

Reconstruction Hospital, Physical therapy, arthritis, arteriosclerosis, high blood pressure, after effects of hemiplegia and visceral disfunction.

St. Luke's Hospital, Operative and day clinics by surgical staff, ward rounds—medicine, radiotherapy, otology clinic, operative otology.

Vanderbilt Clinic, Skin diseases in the aged—atrophy, pruritus, eczema, pigmentations, keratoses and other precancerous changes, neoplasms, clinical demonstrations, therapeutics, pathology.

Women's Hospital, Gynecology, radium and X-ray.

SOCIETY MEETINGS

September 10-14—American Electrotherapeutic Association. Complete notice appears on page 165 of the issue of July 19.

September 18, 19, 20—Fourth Clinical Congress, Connecticut State Medical Society. For detailed notice see page 394.

September 24-28—Sixth Conference of the International Union Against Tuberculosis. For complete notice see page 349, issue of August 16.

October 1-12—The Graduate Fortnight of the New York Academy of Medicine. For complete notice see page 396.

October 15-19—Interstate Post Graduate Association. Complete notice on page 1025, issue of June 28.

December 3-7—Radiological Society Convention. Detailed notice appears on page 712, issue of May 17.

DISTRICT MEDICAL SOCIETIES

Barnstable District Medical Society

Schedule of Meetings: November 1, 1928, February 7, 1929, May 2, 1929.

Berkshire District Medical Society

The especial features of the October meeting will be addresses by Dr. George Crile of Cleveland, Dr. Emil Novak of Johns Hopkins, Dr. Willis Campbell of Memphis, Tennessee, and Dr. Thomas Ordway of Albany, N. Y. A complete program will be published later.

HUGH J. DOWNEY, Secretary.

Bristol North District Medical Society

September 21—Fall meeting. Place to be determined later.

April 18, 1929—Spring meeting.

Bristol South District Medical Society

Meetings will be held November 7, 1928, and May 2, 1929. Complete notice will appear later.

Essex North District Medical Society

October, 1928 (Wednesday afternoon)—A joint meeting with Middlesex East and North, and Essex South. Date and place to be announced.

November 1, 1928 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill (Tel. 3430), at 2 P. M.

January 2, 1929 (Wednesday)—Semi-annual meeting at Haverhill, at 12:30 P. M.

May 1, 1929 (Wednesday)—Annual meeting at Lawrence, at 12:30 P. M.

May 2, 1929 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill, at 2 P. M. (Tel. 3430.)

Norfolk District Medical Society

Below are the proposed meetings of the Norfolk District Medical Society for the 1928-29 Season. The schedule below will be adhered to as strictly as possible. The carrying out of the proposed plan will, of course, depend upon the acceptances of invitations extended to the speakers. Minor changes may be necessary.

October 30—Pondville Hospital. Dr. Lyman F. Jones, Superintendent. Inspection, 4 P. M.; Business Meeting at 5:30; Papers by the Staff; Collation.

November 21—Boston Medical Library. In combination with Suffolk District and Middlesex East District Societies. Subject, Physiotherapy—Dr. F. B. Granger.

January 29—Roxbury Masonic Temple. Subject, Treatment of Varicose Veins by the Injection Method—Dr. E. E. O'Neil. Dr. Homans will open the discussion.

February 26—Roxbury Masonic Temple. Dr. W. R. Ohler. Subject to be announced. Discussion to be opened by Dr. A. A. Hornor.

March 26 — Roxbury Masonic Temple. Subject and speakers to be announced.

May, 1929—Annual meeting program to be announced.

The Censors of the Society meet November 8, 1928, and May 9, 1929, at the Roxbury Masonic Temple, Warren Street, Roxbury, at 4 P. M., for the examination of candidates.

BOOK REVIEWS

Eat, Drink, and Be Healthy. By CLARENCE W. LIEB, M.A., M.D. The John Day Company, New York, 1928.

This book is divided into three parts: the philosophy of eating, choosing your diet, and unfamiliar facts about familiar foods and beverages. In the first part, some of the subjects discussed are worrying about diet, food quantity and quality, mastication, and digestibility. Part two discussed vital foods, satiety value, the normal diet, proteins, fats, and carbohydrates, vitamins and salts, the meals, and the maternal diet. In the third part the author gives his point of view about bread, meats, the folly of spinach, orange juice, candy, desserts, condiments, tea, coffee, and alcohol.

"The aim of the book is to crystallize the present-day knowledge of nutrition. . . . It emphasizes . . . the prevention of disease from faulty eating. . . . But however incomplete our knowledge of nutrition may be, the practical and intelligent application of the wealth of information we already have can make for a better individual, a better home, and a better nation." The work is one essentially for popular perusal. Statements are made and discussed. Here and there the author gives the names of investigators to substantiate his statements. Sometimes similes and stories are used to illustrate the text. In general, the information given is sensible and sound but is sometimes expressed in dogmatic terms. Exception may be taken to the statement that the feces should be slightly acid, food allergy is frequently responsible for headaches, arthritis, and high blood pressure, and that infected teeth, tonsils, and sinuses may infect the alimentary tract. The book may be found useful for those attempting to improve their nutrition.

Nutritional Physiology. P. G. Stiles. W. B. Saunders Company, Philadelphia, 1928.

Another edition of Dr. Stiles' book is a welcome addition to the literature on nutrition. While the work is intentionally general, it considers the subject from the physiological aspect and contains a great deal of useful and scientific information. Some of the twenty-eight chapters include a description and discussion of the nature and means of digestion, the action of the stomach, small and large intestine, the absorption and assimilation of food, the excretory processes, the hygiene of nutrition, food poisoning, alcohol, and internal secretions.

A brief survey of intracellular digestion is commendable. The action of saliva in the digestive process is very properly described at some length, as it is often given insufficient consideration. Exception may be taken to the statement that the human colon "resembles the carnivorous type," and also that nutrition is maintained without the use of the colon. To understand the development and maintenance of the cells, as a very exact and comprehensive process, it does not seem possible that normal nutrition could be carried on without the action of so large a part of the digestive system. A description of the human proximal colon and a statement that antiperistalsis "secures a more perfect absorption of digestive products" supports the previous contention and is welcome in a work on physiology. Interesting observations on insulin, the animo acids, and the vitamins are described. Experimental studies are applied in discussing the quantity of food and valuable information is given on nervous conditions affecting digestion, on constipation, and on obesity. The effect of meat, sugar, food accessories, tea and coffee, and the mineral salts are discussed with commendable consideration; but exception may be taken to the explanation of the relation between sugar and the decay of the teeth.

The book is easy to read, yet accurate, contains a few illustrations, and references are put in for a more complete exposition of some of the subjects or a special purpose. The information given should be valuable for those interested in nutrition, but especially for physicians, medical students, nurses, and dietitians.

Hay Fever and Asthma—Their Cause, Prevention and Treatment. By RAY M. BALYEAT. (Second Edition—Revised and Enlarged.)

This second edition is better than the first and contains a great deal of useful information. The arrangement has been improved, but is not yet satisfactory. The book is padded with barnyard pictures of domestic animals, which, of course, add emphasis, but which also lead to the conclusion that a large proportion of patients with asthma and hay fever are easy to treat, since the cause of their trouble is easy to identify. The information is elementary in every sense and consequently incomplete and often inaccurate.

The JOURNAL does not publish the price of books received for review because of Postal regulations. Requests for this information addressed to the JOURNAL office will receive early attention.